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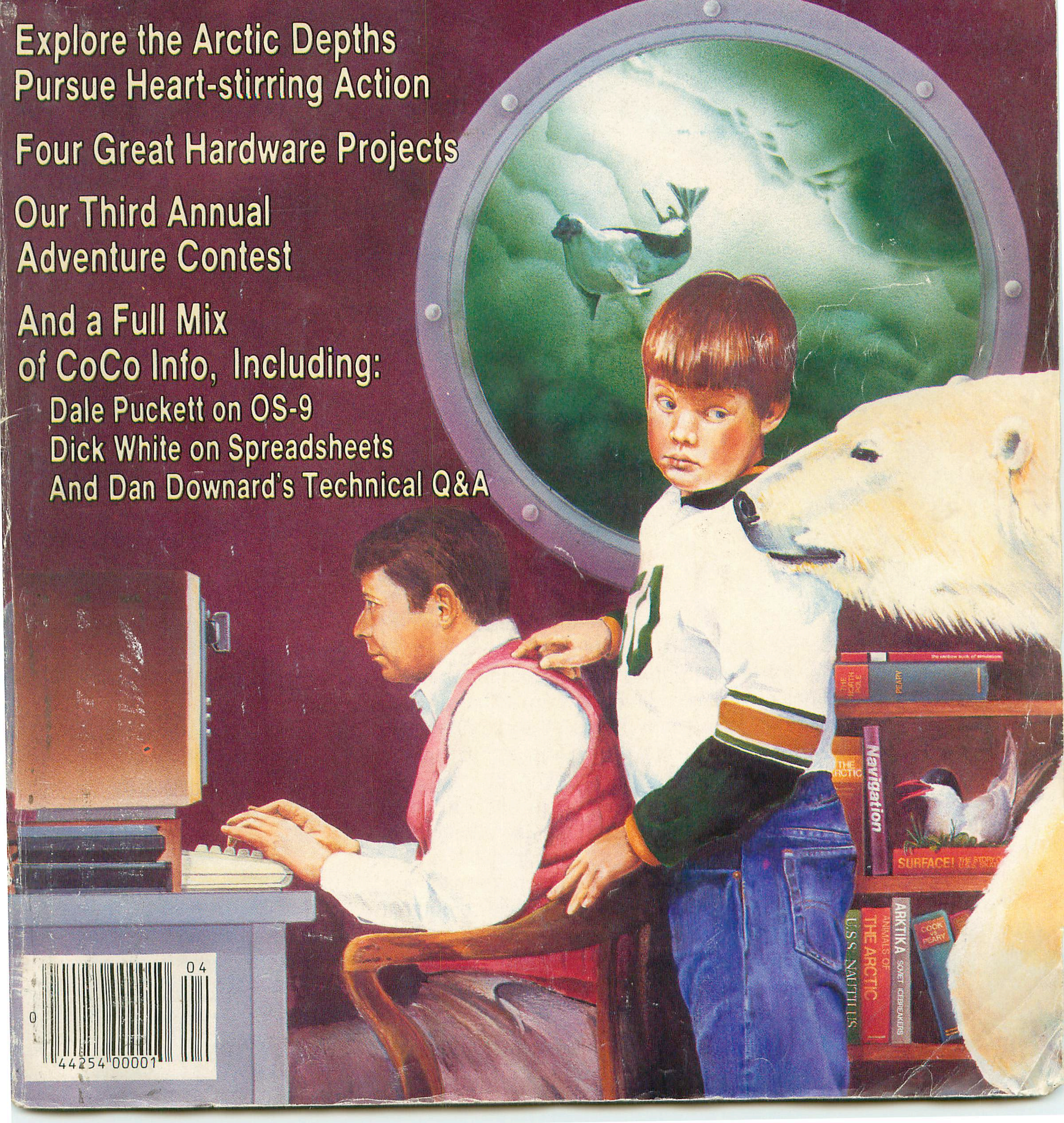
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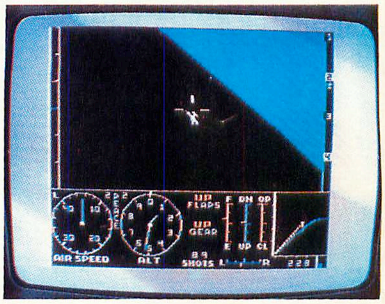
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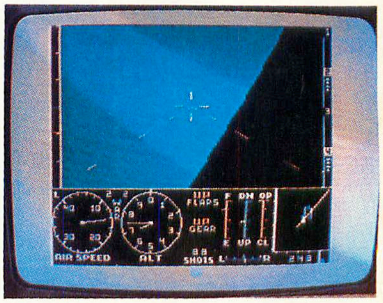
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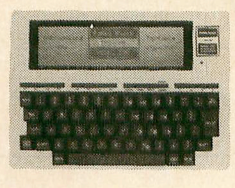

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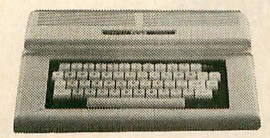

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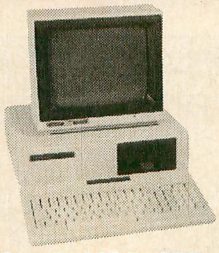

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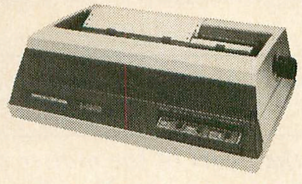

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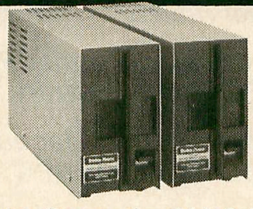

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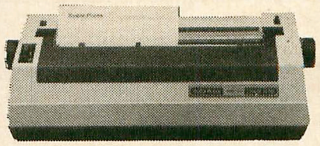

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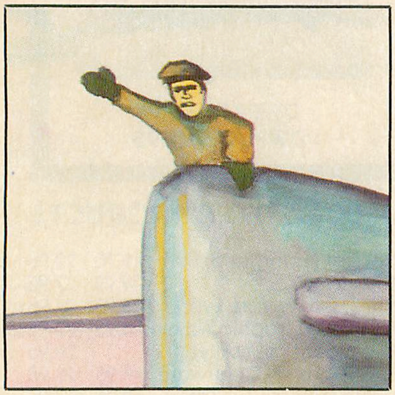
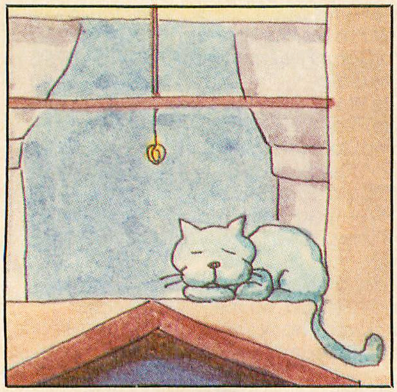
18



42



170

FEATURES

📼 **Run For Your Life!**/*Michael Repasy* 18
GAME *Survival on a strange planet*

Routing Switcher/*Michael J. Lill* 32
HARDWARE PROJECT *Keeps the talk interchanging*

The Decision Has Been Made/*Charles Springer* 36
SIMULATION CONTEST REPORT *The results of our second annual contest*

📼 **Surface**/*Christopher Pfeifer* 42
SIMULATION WINNER *A subaqueous voyage to the North Pole*

📼 **Cardio**/*Rene St. Jacques* 58
SIMULATION WINNER *Getting to the heart of the matter*

📼 **CoCo Payroll Package**/*Dennis Weide* 82
BUSINESS *Part 2, CoCo becomes the paymaster*

Color BASIC ROM Switcher/*Clay Howe* 98
HARDWARE PROJECT *A setup as easy as plugging into a socket*

📼 **The Adventure Writer's Toolkit**/*Eric Tilenius* 105
ADVENTURE TUTORIAL *The necessities for writing your own*

Inverted Video/*Jan Pieter Schreur* 116
MONITOR ENHANCEMENT *Turn your monitor inside out*

📼 **Concert**/*Brian P. Roden* 124
GRAPHICS *Live from CoCo's stage*

So, You Want To Sell Software/*Susan P. Davis* 154
BUSINESS *Part 2, Establishing marketing and payment terms with a software house*

📼 **Landlord's Helper**/*J.D. Ray* 170
BUSINESS *Part 2, CoCo helps manage rental properties*

📼 **Porsche**/*Robert Davis III* 238
GRAPHICS *These wheels are spectacular*

Cover art© by Fred Crawford

📼 The small cassette tape symbols *beside* features and regular columns indicate that the program listings with those articles are on this month's RAINBOW ON TAPE, ready to CLOAD and RUN. For full details, check our RAINBOW ON TAPE ad on Page 217.

NEXT MONTH: Our May issue will feature some "printer's devil" delights: A listing formatter that allows you to take advantage of multiple statement lines and still have a convenient, readable listing; an LLISTer program which provides two-column, hard copy listings. You can test your "Eye Q" with a clue-by-number game, get organized with a practical program designed for cataloging all your tapes and learn how you can generate graphics displays in a jiffy with a simple command!

And we'll keep you enlightened with our usual myriad of utilities, games, programs and reviews — look for THE RAINBOW for the best source of information anywhere on the Color Computer!

COLUMNS

BASIC Training/*Joseph Kolar* 242
Make the most of versatile EDIT

Bits And Bytes Of BASIC/*Richard White* 146
An introduction to spreadsheets

Building April's Rainbow/*Jim Reed* 16
Here come the Users!

Commlink/*R. Wayne Day* 70
Farewell to a "pioneer," a look at some updates and a review of new arrivals

Earth To Ed/*Ed Ellers* 230
Beam up those "tech" questions

Education Notes/*Steve Blyn* 161
Does this sentence make sense?

Education Overview/*Michael Plog, Ph.D.* 167
A question of intelligence and anthropomorphic charm

GameMaster's Apprentice/*George Firedrake and Karl Albrecht* 131
Issuing orders for our Heroic Fantasy adventurers

Print-#2,/*Lawrence C. Falk* 12
Editor's notes

School Is In The Heart Of A Child/*Bob Albrecht and Ramon Zamora* 140
Determine the fate of Wandering Star

Turn Of The Screw/*Tony DiStefano* 163
Adding a numeric keypad to your CoCo

Wishing Well/*Fred Scerbo* 74
Some educational programs to help make learning fun

R. Bartly Betts' "Byte Master" column will return next month.

RAINBOWTECH

Downloads/*Dan Downard* 252
Answers to your technical questions

KISSable OS-9/*Dale L. Puckett* 254
Fun with a CoCo Easter bunny and more

Personable Pascal/*Daniel A. Eastham* 264
Combining Pascal with assembly language

DEPARTMENTS

Advertiser Index 272
Back Issue Information 109
CoCo Clubs 234
Corrections 226
Letters To Rainbow 6
The Pipeline 120
Rainbow Info 130
Received And Certified 188
Reviewing Reviews 190
Scoreboard 158
Scoreboard Pointers 160
Submitting Material To Rainbow 210
Subscription Information 216
These Fine Stores 270

PRODUCT REVIEWS

Product Review Contents 185

The RAINBOW

April 1985 Vol. IV No. 9

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LETTERS TO THE RAINBOW

On The Subject Of Style . . .

Editor:

I must take issue with Mr. Witham's article ["To Pack Or Not To Pack"] on Page 140 of the October 1984 RAINBOW.

Good style usually demands ease of reading. Making programs hard to read to save memory is not just going out of style, it is already out of style. Both 4K and 16K computers are going to be relatively rare very soon.

Young people should make their programs as easy to read as possible within the constraints of their machine. As they mature into other environments where the difference between 44 and 34 bytes is irrelevant, good habits will be a necessity.

The restraints on memory and running time mentioned in the article do not generally relate in a compiler environment. The amount of lines and spaces is irrelevant to a C or PASCAL compiler.

Rather than make a blanket statement like "extra spaces use processing time," he should encourage young users to understand their environment better and use it more efficiently. Programming a 4K CoCo requires certain constraints. Programming in PASCAL on a 256K micro or a VAX in an academic environment is totally different and his rules would be ludicrous.

Anyone with a 64K CoCo 2 can do most anything and still make it readable. If I can read, maintain or understand two readable programs in the time it takes me to understand one of Mr. Witham's programs, then I am better off even if the two run a tiny bit slower or take up a little more room.

I learn a lot from your publication. Thanks.

Larry Geiger
Lawrence, KS

HINTS AND TIPS

Editor:

I use the *Telewriter-64* disk version and the *VIP Terminal* program, but I couldn't load the *VIP* generated files into the *Telewriter* program — *Telewriter* wouldn't read *VIP's* ASCII files.

I wrote Cognitec, who promptly informed me there are different ways to terminate ASCII files, so *Telewriter* didn't find an "end of file" marker and the buffer appears to be empty. They recommended this solution:

1) Load the ASCII file (*VIP* generated)
2) The OK prompt will appear
3) Key in the following, each step followed by ENTER

```
460 END
EN=214
GOTO 458
RUN
```

This returns the user to the ASCII I/O menu. Hit 'E' and the editor will return. Thanks to Cognitec for their support.

Abbey Strauss
New York, NY

AUTO-ANSWER FOR MODEM I-B

Editor:

In regard to my article published in the November 1984 issue of THE RAINBOW [Page 18], titled "Adding An Auto-Answer," I have finally completed the necessary modifications to make my circuit work with the Modem I-B. Anyone interested in this information may write to me at 124 W. Solomon Street, 30223. Please include a SASE.

Tony Sharp
Griffin, GA

MOCALC MODIFICATION

Editor:

I enjoy your magazine very much, and would like to pass along some information other readers might find helpful. While using the spreadsheet program *MoCalc*, which appeared in an article by Barry Spencer in the April 1984 issue [Page 186], I found it desirable to have column and row headings remain on the screen when moving to other than the initial window. To do this, I made the following changes. For column headings add these lines:

```
171 PRINT@34,L$(1,1)
172 PRINT@44,L$(XS+2,1)
173 PRINT@54,L$(XS+3,1)
```

For row labels change Line 1230 to this:

```
1230 POKE1101,50+XS:POKE1111,51+
XS:POKE1091,49+XS:FORX=2TO3:FORY
=1TO13:PRINT@Y*32+X*10+57,L$(X+X
S,Y+YS);:NEXTY,X:X=1:FORY=1TO13:
PRINT@Y*32+X*10+57,L$(X,Y+YS);:N
EXTY:GOTO170
```

Thank you, and keep up the good work.

Ron Whittom
Doniphan, MO

WORTHY DISCOVERY

Editor:

I have hesitated to write about discoveries I have made on my Color Computer, fearing I may have just rediscovered the wheel. But, as I have discussed my recent find with other CoCo owners, it has become apparent that others may benefit from my knowledge.

I have always wanted to use my *Color Scripsit* to write and edit BASIC programs, only to discover I could not load or run the programs. There is a way to do it, however. To write a BASIC program:

1) In Disk BASIC, create an ASCII file by typing `SAVE ''FILESPEC/TXT'',A`
2) Enter *Scripsit* and type the program
3) Save the program using the above filespec

Scripsit evidently writes the file without changing the directory information. The file can be run or sent to others via modem.

BASIC programs can be edited by saving them in the ASCII format, loading them into *Scripsit*, editing and then resaving them using the same filespec.

I hope this will help others who would like the power of *Scripsit* for the writing and editing of BASIC programs.

David L. Watson
Midland, TX

EXCU-U-USE ME!

Editor:

After entering "A Simple Text Processor," January 1985 [Page 103], I was very disappointed to find garbage on my CoCo 2's screen instead of the *TEXTPRO* Menu. After some research using *EDTASM+*, I decided that there must be a difference in ROM versions.

The adjustments necessary to get *TEXTPRO* to run on my CoCo 2 are as follows:

```
POKE88,103
POKE37,127
POKE38,255
```

These pokes should be performed immediately before EXECuting. Thanks again for a great magazine.

Rod Witham
Rogers, AR

COCO CREDIT

Editor:

I am a credit union manager and use the CoCo to prepare all monthly financial and statistical reports. I use *Elite-Calc* and *Telewriter-64*. Credit union folks may write to me at 399 E. Livingston Ave., 43215.

Gene Carey
Columbus, OH

PROGRAM BOOK TEACHES MORSE

Editor:

In the February 1985 issue of THE RAINBOW ["Letters To Rainbow," Page 6], there was a letter asking if anybody has heard about tapes that teach Morse code. I found one program from *TRS-80 Color Programs* by Tom Rugg and Phil Feldman published by Dilithium Press. It is called "Hamcode." It gives you the options of learning characters, phrases, have a single character quiz or a multi-character quiz.

The book is full of programs and I recommend it to people who want to tinker around with their computers. By the way, you don't need Extended Color BASIC for any of the programs. It is available at your local bookstore.

Marc Labbe
Biddeford, ME

THE PERFECT JUDGE

Editor:

Kudos to Paul French for his idea of having an educational software programming contest ["Letters To Rainbow," February 1985, Page 6]; my choice of a judge is (my hero from way back when) Isaac Asimov. He would be perfect for judging the value of the programs in terms of educational worth.

Please have the contest and please let there be a program(s) written to teach me algebra.

Also, I would love to hear from people who have different ideas on teaching themselves programming. Write to me at 220 Card Avenue, 15148.

JoAnn Karaffa
Wilmerding, PA

INFORMATION PLEASE

Editor:

Could you please explain the meaning of << TIME VALUE >> that appears on the mailing label of the magazine?

J.B. Weidner
Somerville, OH

Editor's Note: The "time value" means there is dated material inside. The five-digit number (00000) is your subscription number. The four-digit number is your expiration date (8506) which means the subscription expires June 1985. Please refer to your subscription number and expiration date when writing to us at RAINBOW.

IN SEARCH OF AN ARTICLE

Editor:

I would like to make an RTTY interface for my CoCo using Radio Shack's FSK Generator and Decoder chips. I would appreciate it if someone could send me the article from the June 1983 issue of *Ham Radio* magazine pertaining to this interface. Send article to 7590 Pelham Drive, 44026.

Steve Armbruster
Chesterland, OH

CASSETTE CATALOGER

Editor:

I am a new owner of a TRS-80 Color Computer 2 with Extended 64K. I am hunting for a program I can put on tape and catalog my library of over 1,000 books.

Hope someone can help. Write to me at 115-2nd Drive S.E., 44663.

Sandra Steed
New Philadelphia, OH

CURE FOR COMPUTER CRAVINGS

Editor:

I thought it was about time I wrote to tell you what a great magazine you have. Every time I get a RAINBOW in the mail, it takes me about three weeks to fully digest it and try all the programs and ideas that interest me. All through the fourth week, I get withdrawal symptoms that can only be cured by a "fix" from the next issue. Sometimes I get so desperate that I peruse old issues for tidbits that I may have missed.

J.D. German
Cedar Crest, NM

TP-10 PRINTER PROGRAMS?

Editor:

I have been reading your magazine for about a year now and I must say it is the best for the Color Computer.

I need to know if you know of any software companies that sell programs for the TP-10 thermal printer from Radio Shack. It would be greatly appreciated. Send information to 6813 Arthur St., 70003.

Andrew Urquhart
Metairie, LA

CAN'T CONNECT

Editor:

I am writing in response to the "Turn Of The Screw" article ["The Modem To Printer Connection"], in the October 1984 issue of THE RAINBOW, Page 66. I have the DMP 100 and an acoustic modem. The thing is that Tony said the printer would have to be at 300 Baud. I was going to get the PBH serial interface, but then the connection for my printer would be through the parallel. I would like to know how to make my printer print from the modem, as in his article. Also, I was wondering if a terminal package such as *VIP Terminal* would let me do this. Send information to 1238 Pontiac Court, #37, Canada N7S 4T9.

Rod Alward
Sarnia, Ontario

ADVENTURE BOOK SEEKER

Editor:

I kept reading about the Second Annual Adventure Contest and in the December 1984 issue you had the two best programs. But the 64 dollar question is when will the rest of the contest winners be available to me? I also have the same question about the winners of the Second Annual Simulation Contest. Will these go on sale as their forerunners did?

Mark K. Goodwin
Ft. Stewart, GA

Editor's Note: *The Second Rainbow Book of Adventures* is being written and should be available this summer. *The Second Rainbow Book of Simulations* will be available late this year.

BOLTYPE CONVERSION

Editor:

Last May, I had a program in THE RAINBOW entitled *BOLTYPE*, and I am wondering if any of your readers have successfully managed to convert the program to run using any printer other than the LP VII or DMP-100? If anyone has any information on modifying the program to use the Gemini, Epson, CGP-220, C. Itoh, etc., please contact me at P.O. Box 943, 28532 so I can pass this information on to others who would like to convert it to their own printers. Thank you!

Mike Fahy
Havelock, NC

Editor's Note: *BOLTYPE* appeared on Page 67 in the May 1984 issue of RAINBOW.

WORTH ITS WEIGHT IN STERLING

Editor:

In response to a recent letter, my *Dragon Cruncher* Extended Color BASIC convertor program is available from Elkan Electronics UK, or direct from me. Price: 10 pounds sterling. Contact me at 43 Grasmere Road, Gatley, Cheadle, SK8 4RS.

Frank Philbrow
Cheshire, England

BOUQUETS AND BRICKBATS

Editor:

I would like to say that your magazine is the best Color Computer magazine I have ever read. The programs and the articles are the finest I have ever seen.

With your permission, I would like to send an open letter to the companies that advertise in your magazine:

As an owner of a Color Computer, 90 percent of the software available must be purchased from companies like yours. As a consumer, I have to trust you to deliver the items I purchase from you. So why, when you only ship out partial shipments, don't you include a note stating you are out of stock or the item or items will be shipped at a later date? Otherwise, I figure I might have made a mistake in placing the order or you misread the order or the missing item or items were lost in shipping. When this happens, I have to sit down and write a letter seeking information about the missing item or items.

To date, I have had to write several letters to different companies. So far, the missing item(s) have arrived about two weeks after sending off one of these letters. Is it so hard to put a little note explaining what happened the first time around?

When this happens, I have to really think hard about purchasing other software or hardware from you again. It is not worth the hassle of digging up the shipping receipt and the canceled check or money order receipt and having them photostated, and then wondering if you will take the time to look into the mishap.

A little courtesy goes a long way and leaves a lasting impression.

Edward L. Hoffman
Fontana, CA

HUMANITARIAN DONATION

Editor:

I am writing this letter to inform you of my immense satisfaction with one of your advertisers. I am one of the directors of an organization that helps locate missing and kidnapped children in Denver, Colo. We are a nonprofit organization that helps children, parents and law enforcement agencies in our endeavor to stop this needless brutalization of our children. We are all volunteers and put in a lot of time on this.

I am currently using the Color Computer to keep track of all of the organization's books, lists, etc., but I am not a programmer, so I needed help with software. So, I called VIP Technologies and asked for help. They replied by donating the entire *VIP Library* for us to use to keep track of our paperwork. So far, everything is going great and my job is much easier and faster.

I wish to thank VIP for us and the children, and THE RAINBOW for publishing the best CoCo magazine I have ever had the fortune to read!

Michael R. Stewart
Director, S.T.O.C.
(Stop Taking Our Children)
Englewood, CO

KUDOS

Editor:

I would like to both congratulate and thank those of you from THE RAINBOW magazine for the excellence in CoCo support that seems to be outliving all others.

I would also like to commend someone whose contributions are often seen, but seldom commented upon — Fred Crawford. The cover art he does for THE RAINBOW is outstanding!

Dan Tharp
Pekin, IL

Editor:

I have often purchased software from RAINBOW advertisers which does not work or is not compatible with my system. It is very costly to have unusable software sitting on the shelf, so I try not to buy these days but wait for THE RAINBOW. The quality of the programs carried in RAINBOW is outstanding and with RAINBOW ON TAPE, they always work. Keep up the excellent work in CoCosphere.

Ray Preston
Rarotonga, Cook Islands

USEFUL IS BETTER

Editor:

There are several interesting computer magazines around, but not very many useful ones. John Boyle's article on enhancing screen displays in the February issue ["Simplify And Sharpen Displays," Page 131] is a good example of the kind of article I can and will put to good use.

This kind of down-to-earth, practical programming tutorial keeps THE RAINBOW on top. Thanks, Mr. Boyle, for the excellent article.

Gregory J. Hall
Berkley, MI

RAINBOW TO THE RESCUE

Editor:

I have a little story for you entitled "Interfacing Parallel to Serial," better known to me as "A Month of Frustration."

All my son wanted for Christmas was an Epson FX-80 printer. He had done some research, and because of its print and graphics abilities, determined it to be the one for him.

I was concerned it may not work with his CoCo, so I called the Epson Technical Department. Their technician assured me it would work if I purchased a parallel to serial interface (#8145 or 8148) and a Radio Shack 26-3014 cable.

I purchased the Epson FX-80, Epson #8148 interface, and Radio Shack 26-3014 thinking I was all set. Christmas morning arrived, nothing worked and frustration began. I called Epson's Technical Department again, but they were less than no help, insisting it should work. Still believing in them, I called Radio Shack's Technical Department, but they were no help, having not worked with Epson products. I called the P.C. Learning Center where I purchased the 8148, but they told me their service department would charge $45 per hour to determine what the problem was. Having already spent $500 for a printer Epson told me would work, I was tempted to return it and get my money back before I spent any more.

Then, RAINBOW to the rescue! I saw your article "Cooking With CoCo" by Colin J. Stearman and wrote him about my problem. He wrote back telling me the cable was wrong and how to wire it to get it to work. I am not very mechanical so I was not satisfied with this solution.

Then I saw a RAINBOW advertisment by CNR Engineering. I called them and they not only guaranteed me a workable cable, but offered to sell me an interface at half the cost of the Epson interface.

A happy ending! All I can say now is printing is lots of fun and thank you RAINBOW, Colin Stearman and CNR Engineering for being there in my time of desperation.

Melvin Sharp
Baltimore, MD

BULLETIN BOARD SYSTEMS

Editor:

I would like to announce the opening of a new Color Computer bulletin board system. This board is called CoCoNet and is run on a TRS-80 CoCo with two drives and a Modem II. There are currently nine free message boards, three private boards for validated users, downloads, text files and a lot more. The software was created by me. Call 24 hours a day (614) 475-0047.

Gene Miller, SYSOP
Gahanna, OH

Editor:

Announcing the first CoCo BBS in the Washington D.C./Maryland area. It contains story boards, contests each month with prizes and other surprises. It operates evenings after 6 p.m. and on weekends during daylight hours. Phone (301) 774-

5491. I am also interested in starting a CoCo club in the D.C./Maryland area.

Craig Luecke
Brinklow, MD

Editor:

There is an extremely good bulletin board system called Access-80 in Nashua. Call (603) 888-6999 and it operates 24 hours a day, seven days a week. Special interest areas include a CoCo one, electronic mail, bulletins and more.

Bruce Burleson
Nashua, NH

Editor:

Our BBS features essays and programs devoted to the synthesis of philosophy, art, math, and technology and the right to communicate. If you're not using an IBM, choose lines option at main menu. Call (201) 858-2742, 24 hours except when in use by the SYSOP, 300/1200, seven or eight data bits.

Editor:

I have a version of the Rainboard BBS in operation from 5:30 to 7:30 p.m. CST/CDT daily. The number of the data line is (405) 733-2929.

Thomas P. Reitzel

Editor:

This is an announcement of the formation of Midwest Data X-change. It is a general interest BBS and is online 24 hours a day, seven days a week. It is open to everyone with almost any type of interest.

Midwest Data X-change supports most protocols and boasts a healthy menu. Call (414) 682-0158 (BBS); 682-8378 (voice).

Gary A. Cerkas
Manitowoc, WI

Editor:

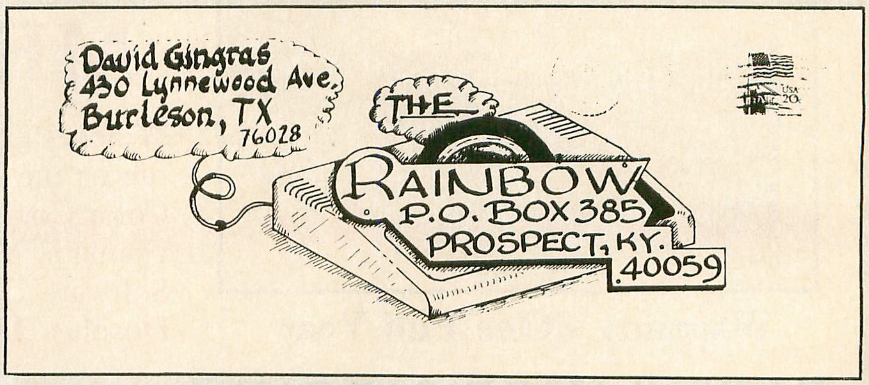
Would you kindly inform your readers of our new BBS located in New York City? It is dedicated to Color Computer users and features a database, private and public messages, merchandise, upload and download sections, as well as hints, tips, pokes and other areas of interest.

The board is up 24 hours a day, seven days a week and is running on four 40-track drives. Readers can reach the BBS by dialing (212) 682-0681 anytime.

Steven Schechter
New York, NY

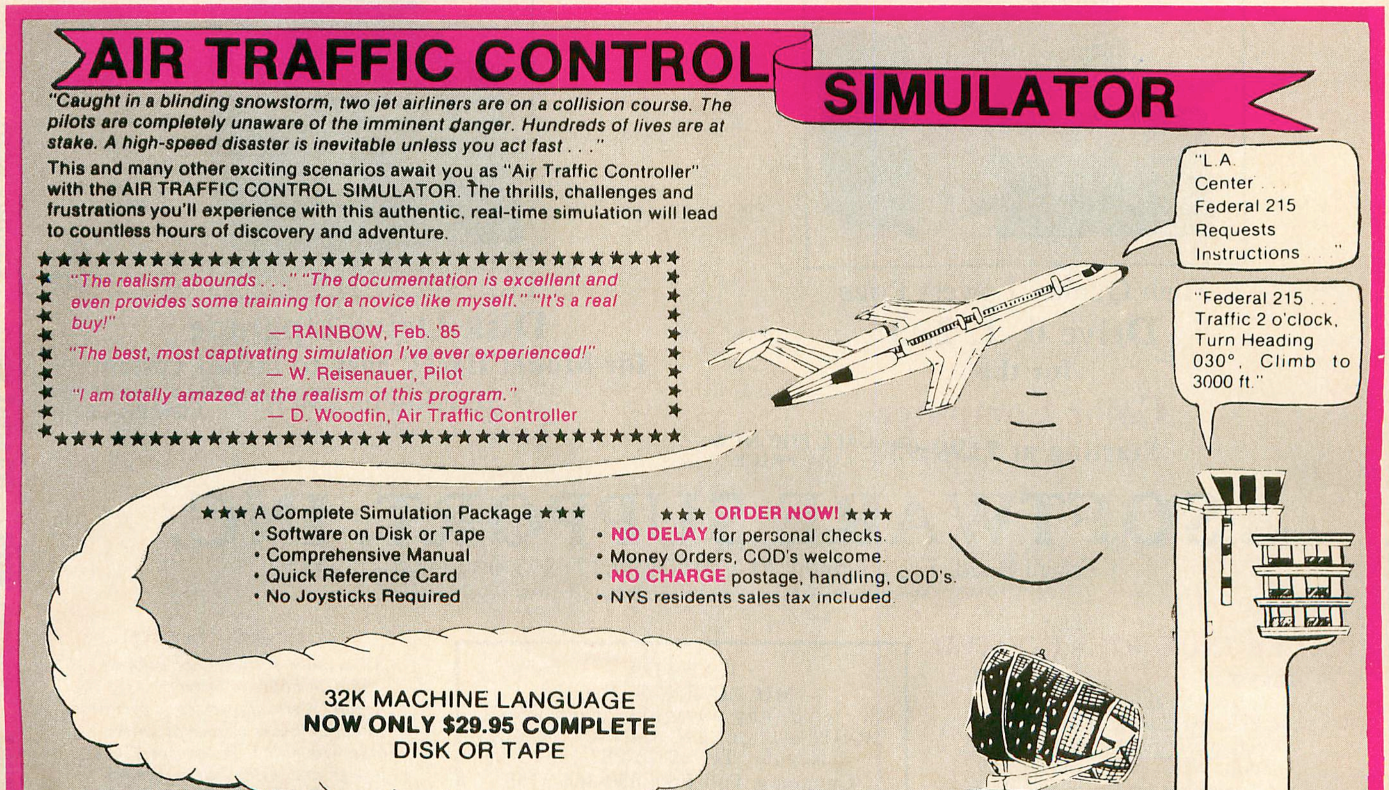
The RAINBOW welcomes letters to the editors. Mail should be addressed to: Letters to Rainbow, Falsoft, Inc., 9529 U.S. Highway 42, P.O. Box 385, Prospect, KY 40059. Letters should include the writer's full name and address. Letters may be edited for purposes of clarity or space.

ARTS AND LETTERS



Envelope Of The Month

David Gingras
Burleson, TX



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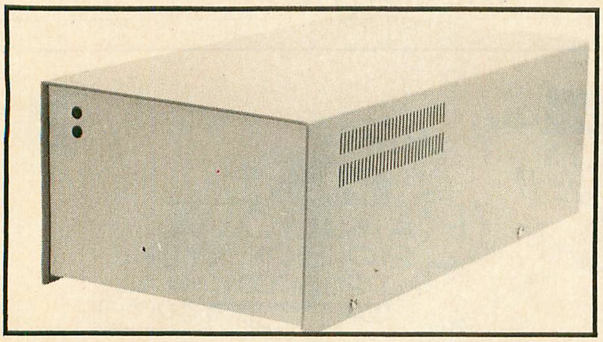

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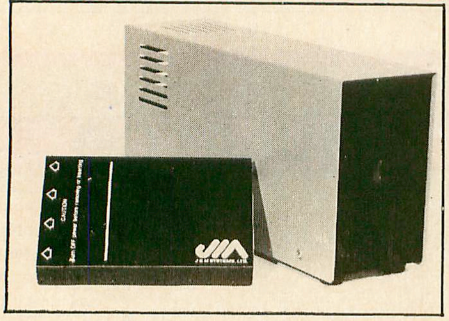

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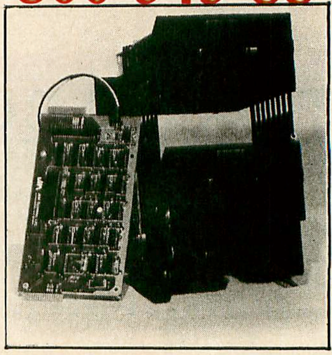

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PRINT #-2,

We're really excited here because we now have the first copies of *The Complete Rainbow Guide To OS-9.* In case you've been wondering where it was, the answer is yes, it is late, but it has been well worth waiting for.

What made the *Guide* so late? After all, we planned to have it ready for the holiday season. The reason is simply that the *Guide* is a lot like Topsy — it just grew.

We planned for a book of about 300 pages and a disk to have a few programs to go along with it. The book would sell for $19.95 retail and the disk for the same price. But our two fine authors — Dale Puckett and Peter Dibble — did more writing than we thought they would. So, the *Guide* is more than 400 pages and there are two disks instead of one.

I decided to stick with the original price on the book. After all, it has been advertised at $19.95. But, with two disks, we had to raise the cost of that package to $31. Still a darn nice bargain. I believe the *Guide* will be one of the definitive works on *any* computer operating system. Certainly it has it all as far as OS-9 is concerned and presents everything in a way that people will be able to learn from.

My apologies to those of you who ordered early and had to wait longer than we thought you would. I think, though, that you will agree that the wait was worth it. This is a fine publication and a worthy addition to *The Rainbow Bookshelf.*

I have already mentioned our authors — Dale Puckett and Peter Dibble —but it would not be fair not to say what a wonderful job they have done. Not only that, but they worked in a very timely manner, did a fine job indexing and have provided a lot of excellent programs to boot.

Those who I have not yet mentioned are on our staff and include Courtney "Dr." Noe, who was in charge of the project at our end and who edited the publication. Charlie "Springboard" Springer provided backup and tied up some loose ends. Tamara Solley did much of the proofing and typesetting (a massive job) and Jerry McKiernan did all the illustrations. In so doing, Jerry created a new personality: "Ossie," a cartoon character who helps break up copy on the pages and provides a sort of graphic guide to the book. Jim Reed helped, too, with overall guidance.

Ken Kaplan and his folks at Microware Systems Corp. were a great help in the publication. We could not have done it without their support and assistance. Likewise, Richard "Richie" Don and Frank Hogg assisted us, too.

Thanks to everyone who helped. I think you'll agree we have a winner here.

If you missed the CoCo Community's midwinter gathering, our RAINBOWfest in Irvine, Calif., this is just a reminder that May 17-19 and RAINBOWfest-Chicago are not too far away. This year's show will mark the third anniversary of RAINBOWfest — and we hope to have a super-duper surprise as a part of the program. I hope to be able to let you know about that in a month or so.

I must close this month's issue on a sad, and belated, note. Early on in the days of THE RAINBOW, a gentleman by the name of Greg Wilson started publishing — under a license to us — an Australian edition of

Telewriter-64™

the Color Computer Word Processor

- **3 display formats: 51/64/85 columns × 24 lines**
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THE ORIGINAL

Simply stated, Telewriter is the most powerful word processor you can buy for the TRS-80 Color Computer. The original Telewriter has received rave reviews in every major Color Computer and TRS-80 magazine, as well as enthusiastic praise from thousands of satisfied owners. And rightly so.

The standard Color Computer display of 32 characters by 16 lines without lower case is simply inadequate for serious word processing. The checkerboard letters and tiny lines give you no feel for how your writing looks or reads. Telewriter gives the Color Computer a 51 column by 24 line screen display with *true lower case characters*. So a Telewriter screen looks like a printed page, with a good chunk of text on screen at one time. In fact, more on screen text than you'd get with Apple II, Atari, TI, Vic or TRS-80 Model III.

On top of that, the sophisticated Telewriter full-screen editor is so simple to use, it makes writing fun. With single-letter mnemonic commands, and menu-driven I/O and formatting, Telewriter surpasses all others for user friendliness and pure power.

Telewriter's chain printing feature means that the size of your text is never limited by the amount of memory you have, and Telewriter's advanced cassette handler gives you a powerful word processor without the major additional cost of a disk.

> *...one of the best programs for the Color Computer I have seen...*
> — Color Computer News, Jan. 1982

TELEWRITER-64

But now we've added more power to Telewriter. Not just bells and whistles, but major features that give you total control over your writing. We call this new supercharged version Telewriter-64. For two reasons.

64K COMPATIBLE

Telewriter-64 runs fully in any Color Computer — 16K, 32K, or 64K, with or without Extended Basic, with disk or cassette or both. It automatically configures itself to take optimum advantage of all available memory. That means that when you upgrade your memory, the Telewriter-64 text buffer grows accordingly. In a 64K cassette based system, for example, you get about 40K of memory to store text. So you don't need disk or FLEX to put all your 64K to work immediately.

64 COLUMNS (AND 85!)

Besides the original 51 column screen, Telewriter-64 now gives you 2 additional high-density displays: 64 × 24 and 85 × 24!! Both high density modes provide all the standard Telewriter editing capabilities, and you can switch instantly to any of the 3 formats with a single control key command.

The 51 × 24 display is clear and crisp on the screen. The two high density modes are more crowded and less easily readable, but they are perfect for showing you the exact layout of your printed page, *all on the screen at one time*. Compare this with cumbersome "windows" that show you only fragments at a time and don't even allow editing.

RIGHT JUSTIFICATION & HYPHENATION

One outstanding advantage of the full-width screen display is that you can now set the screen width to match the width of your printed page, so that "what you see is what you get." This makes exact alignment of columns possible and it makes hyphenation simple.

Since short lines are the reason for the large spaces often found in standard right justified text, and since hyphenation is the most effective way to eliminate short lines, Telewriter-64 can now promise you some of the best looking right justification you can get on the Color Computer.

FEATURES & SPECIFICATIONS:

Printing and formatting: Drives any printer (LPVII/VIII, DMP-100/200, Epson, Okidata, Centronics, NEC, C. Itoh, Smith-Corona, Terminet, etc).

Embedded control codes give full dynamic access to intelligent printer features like: underlining, subscript, superscript, variable font and type size, dot-graphics, etc.

Dynamic (embedded) format controls for: top, bottom, and left margins; line length, lines per page, line spacing, new page, change page numbering, conditional new page, enable/disable justification.

Menu-driven control of these parameters, as well as: pause at page bottom, page numbering, baud rate (so you can run your printer at top speed), and Epson font. "Typewriter" feature sends typed lines directly to your printer, and Direct mode sends control codes right from the keyboard. Special Epson driver simplifies use with MX-80.

Supports single and multi-line headers and automatic centering. Print or save all or any section of the text buffer. Chain print any number of files from cassette or disk.

File and I/O Features: ASCII format files — create and edit BASIC, Assembly, Pascal, and C programs, Smart Terminal files (for uploading or downloading), even text files from other word processors. Compatible with spelling checkers (like Spell 'n Fix).

Cassette verify command for sure saves. Cassette auto-retry means you type a load command only once no matter where you are in the tape.

Read in, save, partial save, and append files with disk and/or cassette. For disk: print directory with free space to screen or printer, kill and rename files, set default drive. Easily customized to the number of drives in the system.

Editing features: Fast, full-screen editor with wordwrap, block copy, block move, block delete, line delete, global search and replace (or delete), wild card search, fast auto-repeat cursor, fast scrolling, cursor up, down, right, left, begin line, end line, top of text, bottom of text; page forward, page backward, align text, tabs, choice of buff or green background, complete error protection, line counter, word counter, space left, current file name, default drive in effect, set line length on screen.

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our magazine. Greg extracted most of the editorial material, used a lot of exclusive Australian news, and became the major CoCo force "Down Under."

This fall, much to the dismay of literally thousands of CoCo users, Greg was killed — apparently when he surprised a burglar in his home. This was really a shock to us all.

It is difficult to forget Greg. Although I never met him face-to-face, he would call about once every six weeks, and with a background noise in the phone which I always fantasized as leagues and leagues of Pacific Ocean rushing over the telephone cable, we would chat about the Color Computer, the nature of business and the differences between the "Yanks" and the "Aussies."

He was a charming man. Kind, generous and caring. He loved the Color Computer and worked as hard as anyone to see it grow and prosper.

And Greg Wilson's Australian RAINBOW will continue on. A fellow by the name of Graham Morphett has taken over the license and is reprinting the Australian edition as before. We now sell "Yank" versions of THE RAINBOW in Australia, but the Australian RAINBOW is also strong and growing and — I'm sure Graham will agree — that's a tribute to Greg Wilson's foresight and stewardship.

— Lonnie Falk

Hint . . .

Restoring BASIC Programs

Did you ever type in a program and `RUN` it, only to lose it all when it crashed and completely restarted your computer? This short program will restore BASIC programs that are lost in this way.

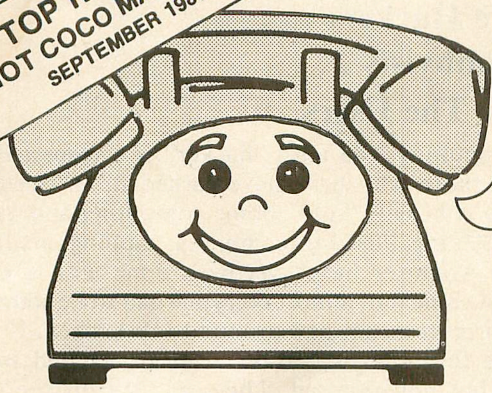
The actual program is in machine language; this BASIC program will poke it into your computer and save it to disk for you. (On cassette systems, change the `SAVEM` in Line 40 to `CSAVEM`.)

It works because, when the CoCo reinitializes in this manner, it doesn't actually erase what was in RAM, but instead simply resets five memory locations. This program finds the start and end of the BASIC program and sets up the pointers to what they were before.

```
0 'RESTORE MACHINE LANGUAGE BASI
C LOADER
10 CLS:FORI=480TO510:READA$:POKE
 I,VAL("&H"+A$):NEXT
20 PRINT@224,"INSERT TARGET DISK
 INTO DRIVE 0":PRINT@263,"AND PR
ESS <ENTER>
30 A$=INKEY$:IFA$<>CHR$(13)THEN3
0
40 SAVEM"RESTORE",480,510,480
50 CLS:PRINT@231,"ANOTHER COPY <
Y/N>?
60 A$=INKEY$:IFA$=""THEN60ELSEIF
A$="Y"THEN20ELSECLS
70 DATA5F,9E,19,1F,12,30,4,A6,80
,26,FC,C1,0,26,3,AF,A4,5C,A6,84,
26,EF,30,2,9F,1B,9F,1D,9F,1F,39
```

Maj. Richard D. Benton
Carson, Calif.

TOP RATINGS
HOT COCO MAGAZINE
SEPTEMBER 1984



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GOOD LOOKIN'

AUTOTERM shows true upper/lower case in screen widths of 32, 40, 42, 51, or 64 characters with no split words. The width of 32 has extra large letters. Scrolling is forward, backward, and fast. Block graphics pictures are displayed automatically and can be scrolled.

The screen's top line shows operating mode, unused memory size, memory on/off, and caps-lock on/off. It also gives helpful prompts.

SWEET TALKIN'

KEY-BEEP can be on/off. Unacceptable keystrokes cause a lower pitched BOP! This ERROR-BEEBOP can be on/off.

Talks to other computers with Full or Half Duplex; Baud Rate of 110, 150, 300, 600, 1200; Parity as even, odd, mark, space, none; 7 or 8 bit Word; any Stop Bits; all 128 ASCII characters; true line Break; XON/XOFF protocol; and optional line-at-a-time transmission. Able to send and receive text, block graphics, BASIC and ML programs. A 64K machine holds up to 46,600 characters (34,900 in HI-RES).

DUAL PROCESSING lets you review & edit while more data is coming in.

Fully supports D.C. Hayes and other intelligent modems.

Talks to your printer with any page size, margins, line spacing, split word avoidance. Embed your printer's control sequences for boldface, underlining, etc. Narrow text can be automatically spread out.

You'll also use Autoterm for simple word processing and record keeping

You can display directories, delete files, transmit directly from disk, and work with files larger than memory. Easily maintain a disk copy of an entire session.

Compatible with TELEWRITER (ASCII) & other word processors.

SMOOTH WALKIN'

AUTOTERM moves smoothly and quickly between word processing and intelligent terminal action. Create text, correct your typing errors; then connect to the other computer, upload your text, download information, file it, and sign-off; then edit the received data, print it in an attractive format, and/or save it on file.

Editing is super simple with the cursor. Find strings instantly, too! Any operating parameter, such as screen width, can be altered at any time. Uncompleted commands can be cancelled.

PUTTY IN YOUR HANDS

The word processor can be used to create, print, and/or save on file your personal KSMs. They let AUTOTERM act like you. For example, it can dial through your modem, sign-on, interact, perform file operations, & sign-off; an entire session without your help. KSMs can answer the phone, prompt the caller, take messages, save them, hang-up, and wait for the next call. The KSM potential is unbelievable!

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Banta, *HOT CoCo*, 9/84

"Almost a full featured word processor..."
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B&B Software

BUILDING APRIL'S RAINBOW

In The Beginning Were Hackers . . .
Then Came The Hobbyists . . .
Now, Here Come The Users . . .

Within the CoCo Community, the term "hacker" is a respected title worn with pride by those who have have earned it. In essence, it means someone who is heavily "into" home computing and usually spends his every free minute PEEKing, POKEing, compiling, zapping, modifying and, in general, trying to do whatever hasn't yet been done with a CoCo. When the Color Computer first came out, almost everyone had to be somewhat of a hacker since almost any project meant new ground to be broken.

Fast upon their heels came the hobbyists, those who are excited by and fond of personal computing, but not obsessed. They can shut off the CoCo long enough to watch *Monday Night Football* and maybe *Hill Street Blues.* Most hobbyists are content to let someone else map out the schematic for a project; they'll install the kit. Hobbyists are attracted to published programs that they can adapt to their own needs. Like the hacker, they like to tinker and compute for computing's sake.

Of course, these definitions are sketchy and there are many shades of gray, i.e., the "serious hacker" versus the Saturday-mornings-only variety. A large number of CoCo hobbyists are primarily "hardware types." Others would never touch the hardware, but can't sleep until they've completed their latest programming innovation. Then there are Adventurers, Simulators, action gamers, utilitarians, CoCo artists and musicians, BBSers, authors and teachers, too. The list could be expanded *ad infinitum*, but, presently anyway, don't call any of them "users" unless you want to get their hackles up. That, too, will change as the CoCo Community evolves.

If you don't know what a "user" is, the business world is full of them: people who use the computer for a specific job function, then turn it off and go home and forget it. (Imagine that!) Now that the price has become so reasonable, more and more users are buying home computers. Get ready for the users because just as hobbyists quickly overtook and greatly surpassed hackers in sheer numbers, users are legion and coming on stronger daily.

Vicki Merritt is a user. Though she never mentioned the word in a long, handwritten letter to THE RAINBOW, she explained in no uncertain terms that she considers the CoCo a promising *tool* for such things as "home record keeping, correspondence and hobbies, and very small business applications.

"I did not buy my computer to be a toy," she continues. Rather, she views the CoCo not as a source of diversion, but more as a household appliance. She makes it clear she "wouldn't mind" typing in published listings, but they must be highly practical, time-saving programs that she can use to organize her life. She states flatly that she wants to use these programs, not study how they were developed.

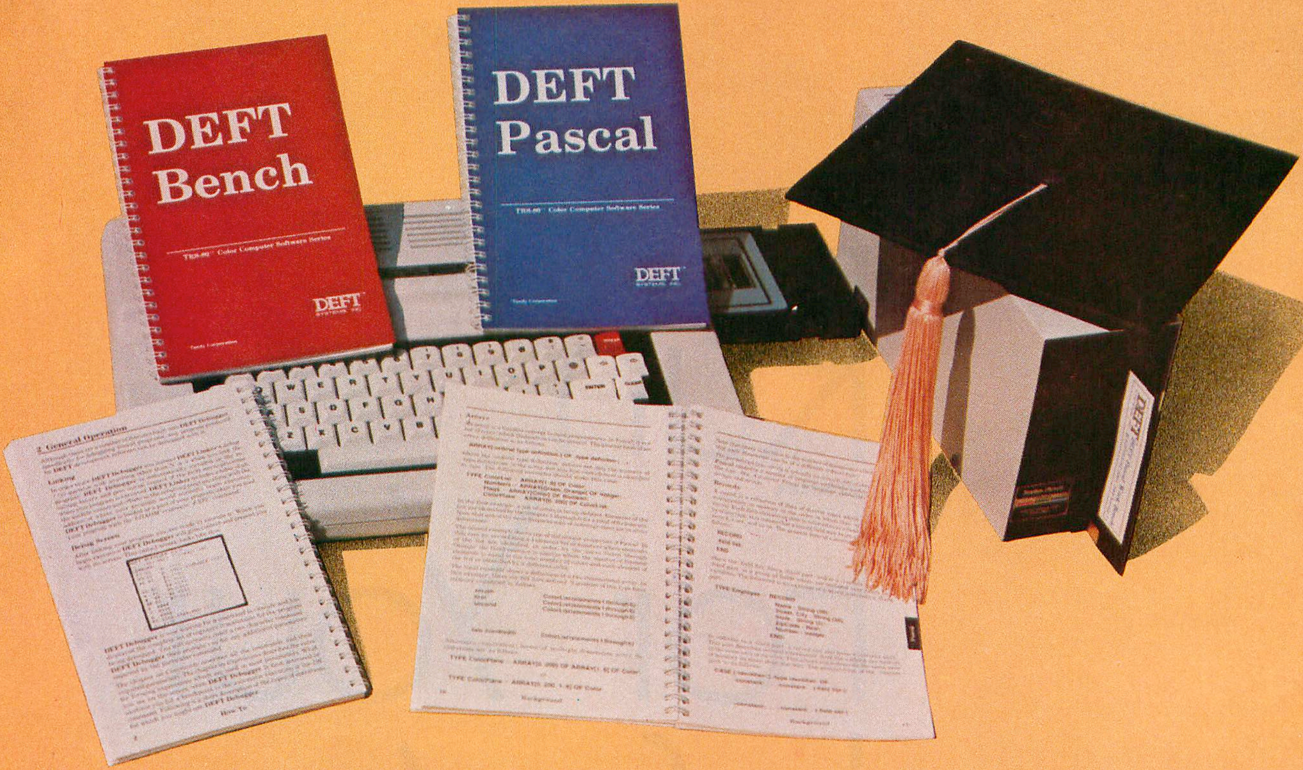
Well, Vicki, you picked the right tool. You just need to develop your library. In addition to the latest commercial programs, I sincerely recommend the wealth of material in back issues of THE RAINBOW. Also, CoCo user groups and computer bulletin boards have hundreds of public domain programs that are yours for the asking. And, have patience, more is on the way because we're searching for material just for people such as you.

To you writers and programmers, open your eyes to what's happening and let's develop and submit more no-nonsense, straightforward programs to help those who want to harness the power of the computer for *practical* applications. Here at THE RAINBOW, we welcome the rapidly growing user segment of our readership, and we firmly believe there's room for everyone in the CoCo Community. After all, we do have a common purpose: to get the most out of the Color Computer, to develop the machine, to make the CoCo sing.

A practical suggestion I make every month to all CoCo users, from veteran hackers to those who've just opened the packing case, is to subscribe to THE RAINBOW, and RAINBOW ON TAPE, too, for more information on the CoCo than is available from any other source. Become a RAINBOW user.

— **Jim Reed**

Volume Price Breakthrough!!



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Stranded . . .
weaponless . . .
oxygen running out . . .

Run For Your Life!

By Michael Repasy

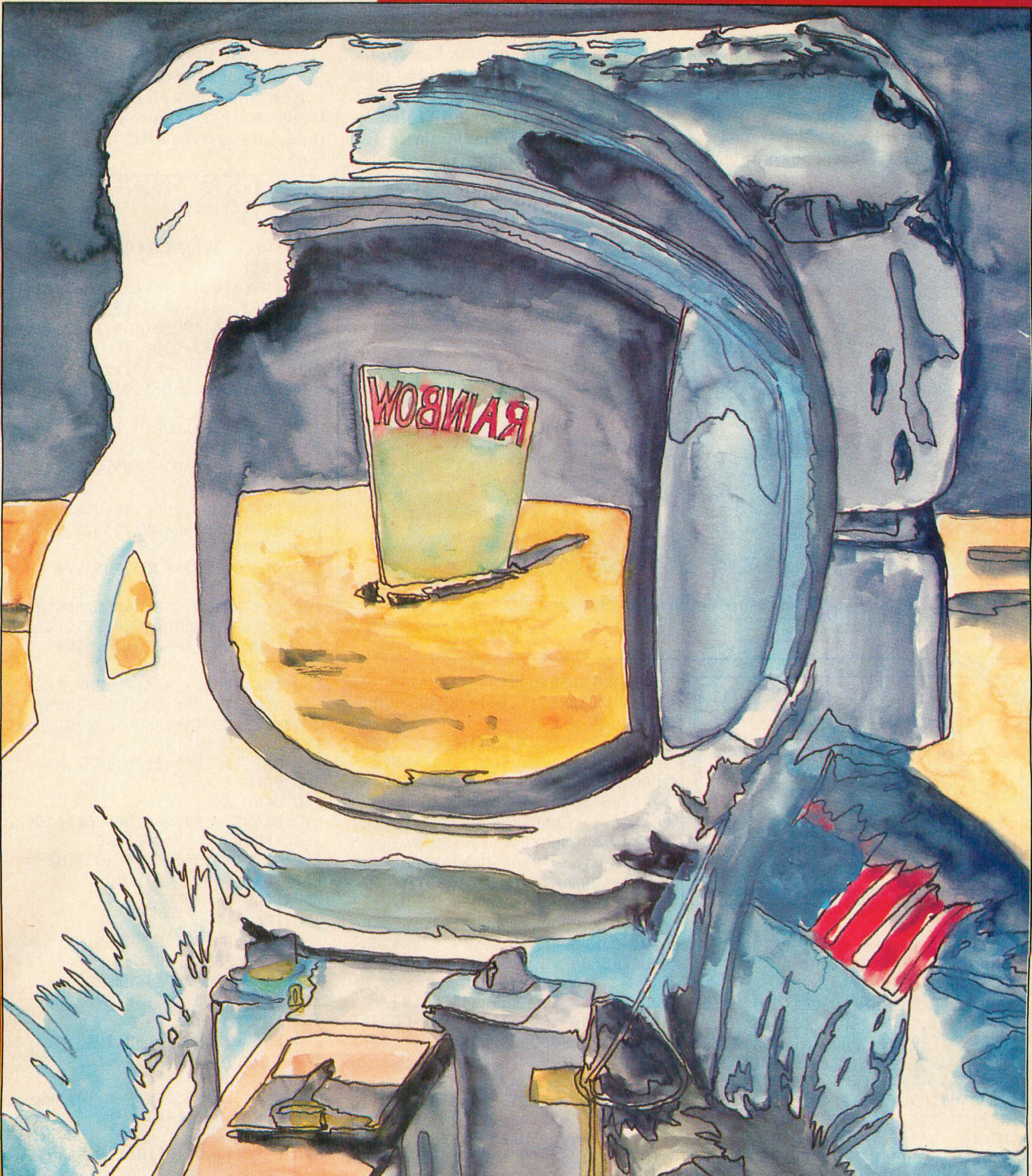
Scenario: You were on a spaceship traveling to your home planet. The ship sustained heavy damage due to a meteor shower. You were ejected from the ship in a space pod. Your space pod landed just 20 miles from a small military base on a strange planet. You must walk to the base if you are to survive. There are many obstacles blocking your way and you have only enough oxygen to make it to the base with little or no delays.

The ending to this story is up to you and your playing skills. Death can occur by hitting the obstacles or by running out of oxygen. There is that small possibility you will make it to the base. Whatever happens, I hope you'll have fun. Good luck! (You will surely need it.)

(Michael Repasy is a 15-year-old high school student. His knowledge of the CoCo is self-taught. Aside from spending a minimum of four hours a day with his CoCo, Mike enjoys cross-country skiing, game fishing and math challenges.)

Instructions

1) Before typing in the program, for those of you with disk drives, make sure you unplug the disk controller.
2) To move your man forward, just move your joystick right. To make your man stop, move your joystick left. To make your man jump, press the firebutton.
3) The obstacles you will face include spider webs, water, pits and sharp crystals. If you hit any of the obstacles, except the pits, you will die. If you hit a pit, you will fall down to the lower level.
4) Avoiding the obstacles isn't very hard; all you must do is jump over them.
5) When you die by hitting an


RAINBOW

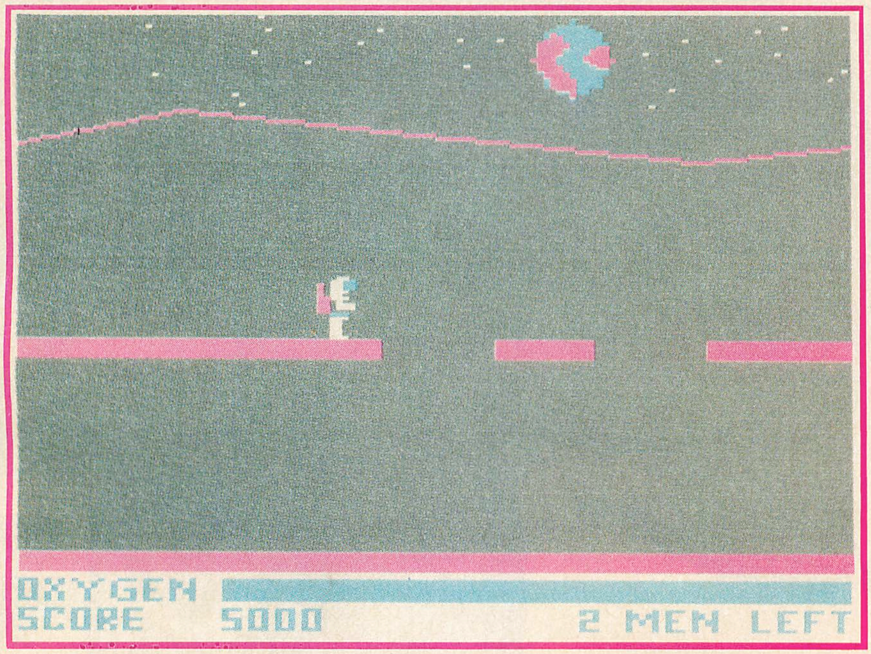
obstacle, you don't lose the game. You have two men in reserve you can use. However, if you die by running out of oxygen, then you lose the game.

6) Every 20 boards you get a 5,000 point bonus and you get to choose on which level to place your man. If you fall down a pit, you lose 250 points. If you reach the base, your final score will be computed.

7) The computer will list the top 10 scores at the end of the game. If you are one of the top 10, you will be asked to enter your initials. This is done as in the arcade; you move the blinking blue box around the letter of your choice and press the firebutton to enter that letter. If you circle the word "enter" or you reach the maximum of five letters, the computer will store your name. If you make a mistake, circle the word "clear." This will allow you to reenter your name.

8) The oxygen level and the number of men you have in reserve are shown at the bottom of your playing screen.

Now you know all that you need to know about the game. The only other thing you are required to do is have fun!



80	48	2680	111
150	243	2780	217
280	136	4020	69
470	121	4150	30
645	105	6070	33
1050	8	7000	140
1350	244	7590	84
1580	9	7738	132
1820	104	END	254
2440	22		

The listing:

```
1 CLS:PRINT:POKE 65495,0
10 PCLEAR 5:CLEAR 2000
20 PMODE4,2:PCLS
30 DIM L$(26),N$(10),M1(20),M2(2
0),M3(20),M4(20),MJ(20),LS$(5),P
1(20),P2(20),P3(20),P4(20),P5(20
),ST(200),F1(40),F2(40),F3(40),F
4(40),F5(40),F6(40),F7(40),F8(40
),F9(40),F0(40),FA(40),FB(40),CI
(20),CM(20),MH(20),E1(10),DM(20)
,HS(10),HS$(10)
40 N$(0)="R4D6L4U6":N$(1)="BR2D6
":N$(2)="NDR4D3L4D3R4":N$(3)="ND
R4D3NL3D3L4U":N$(4)="D3R4U3D6"
50 N$(5)="NR4D3R3FDGL3":N$(6)="N
R4D6R4U3L4":N$(7)="R4DG4D":N$(8)
="R4D6L4U3NR4U3":N$(9)="NR4D3R4U
3D6"
60 L$(1)="BD6U4E2F2DNL4D3BR4BU6"
:L$(2)="D6R3EUHNL3EUHL3BR8":L$(3
)="R4DUL4D6R4UBR4BU5":L$(4)="D6R
2E2U2H2L2BR8":L$(5)="NR4D3NR3D3R
4BR4BU6"
70 L$(6)="NR4D3NR3D3BR8BU6":L$(7
)="BR1NR4GD4FR4U3LBR5BU3":L$(8)=
"D6U3R4D3U6BR4":L$(9)="R4L2D6L2R
4BR4BU6":L$(10)="BR4D4G2H2BR8BU4"
80 L$(11)="D6U3RNF3E3BR4":L$(12)
="D6R4BR4BU6":L$(13)="ND6F4E4ND6
BR4":L$(14)="ND6F6U6BR4":L$(15)=
"R4D6L4U6BR8"
90 L$(16)="R4D3L4D3U6BR8":L$(17)
="NR4D3R4U3D6RBR4BU6":L$(18)="R4
D3L3NF3LD3U6BR8":L$(19)="NR4D3R4
D3L4BR8BU6":L$(20)="R4L2D6BR6BU6
"
100 L$(21)="D6R4U6BR4":L$(22)="D
4F2E2U4BR4":L$(23)="D6E4F4U6BR4"
:L$(24)="DF4DUH2G2DUE4UBR4":L$(2
5)="F4ND2E4BR4":L$(26)="R4DG4DR4
BR4BU6"
110 LS$(1)="M+55,-10M+50,+15M+10
0,-10M+50,+5":LS$(2)="M+100,-10M
+28,+10M+50,-5M+28,-5M+50,+5":LS
$(3)="M+105,-10M+50,+15M+50,-5M+
25,+5M+25,-5":LS$(4)="M+28,-10M+
100,+15M+50,-15M+50,+15M+28,-5":
LS$(5)="M+50,-10M+156,+15M+50,-5
"
120 PMODE3,1:PCLS
130 A$="M+4,-2M+4,+2":DRAW"BM128
,90C4;XA$;XA$;XA$;XA$;XA$;D2L40U
2"
140 PAINT(130,91),4,4:GET(128,88
)-(168,91),E1,G
142 PCLS
144 COLOR 3,1:LINE(0,100)-(255,1
05),PSET,BF
146 PUT(116,100)-(156,103),E1,PS
ET:GET(0,100)-(255,105),F8
147 PUT(164,100)-(204,103),E1,PS
ET:GET(0,100)-(255,105),F9
148 PUT(40,100)-(80,103),E1,PSET
:GET(0,100)-(255,105),F0
150 PCLS
152 COLOR3,1:LINE(0,100)-(255,10
5),PSET,BF
154 PUT(160,100)-(200,103),E1,PS
ET
155 DRAW"BM40,100C1NR96R2DNR92R2
DC2NR88R2DNR84R4DNR76BM72,100C3N
R32DL2R36"
157 GET(0,100)-(255,105),FA
159 PCLS
160 A$="BM128,96C4R4U6L2ND6L2D6U
2LC3NU4L2NU8BR3BU4C4U4E2R2F2DGL2
DU4RC2NR2DNR2DNR2BM128,95R4
170 DRAW A$
180 DRAW"BM128,96C4F6R2NUL2EM-3,
-4LF4BM127,98M+1,+2M-2,+2H2M+2,-
2FGBM128,90C1NF4BR3C4F3R3UL3H3RC
1F2BM132,94C4RL2U
190 GET(112,84)-(136,102),M1
200 PCLS
210 DRAW A$
220 DRAW"BM128,96C4D6NU6R4L2U6BU
2L2C1NR6U3BR4R2DC4L2DR2
230 GET(112,84)-(136,102),M2:GET
(112,84)-(136,102),M4
240 PCLS
250 DRAW A$
260 DRAW"BM132,96C4G6HM128,96R2G
4BM128,96F6R2NUL2EM-3,-4LNF4BD3C
1E3BM128,90C1DBD3R4U3R2DC4DR2U
270 GET(112,84)-(136,102),M3
280 PCLS
290 PUT(112,84)-(136,102),M1
300 LINE(100,97)-(150,102),PRESE
T,BF
310 DRAW"BM128,96C4M+8,+4R2NM-8,
-4EM132,96M-8,+4L2NM+8,-4UM128,9
6L2C1M+8,+4
320 GET(112,84)-(136,102),MJ
330 PCLS
340 CIRCLE(128,96),12,4:PAINT(12
8,96),4,4
350 GET(116,84)-(140,108),P1
360 PAINT(128,96),2,1
370 DRAW"BM128,107C3U4H4UL2U2E4H
4D2R2L4DL2NR6DNR6DNR4DNR4DNR2DL2
R4L2DNR4DNR6DNR6R2DNR6DNR6R2DNR6
```

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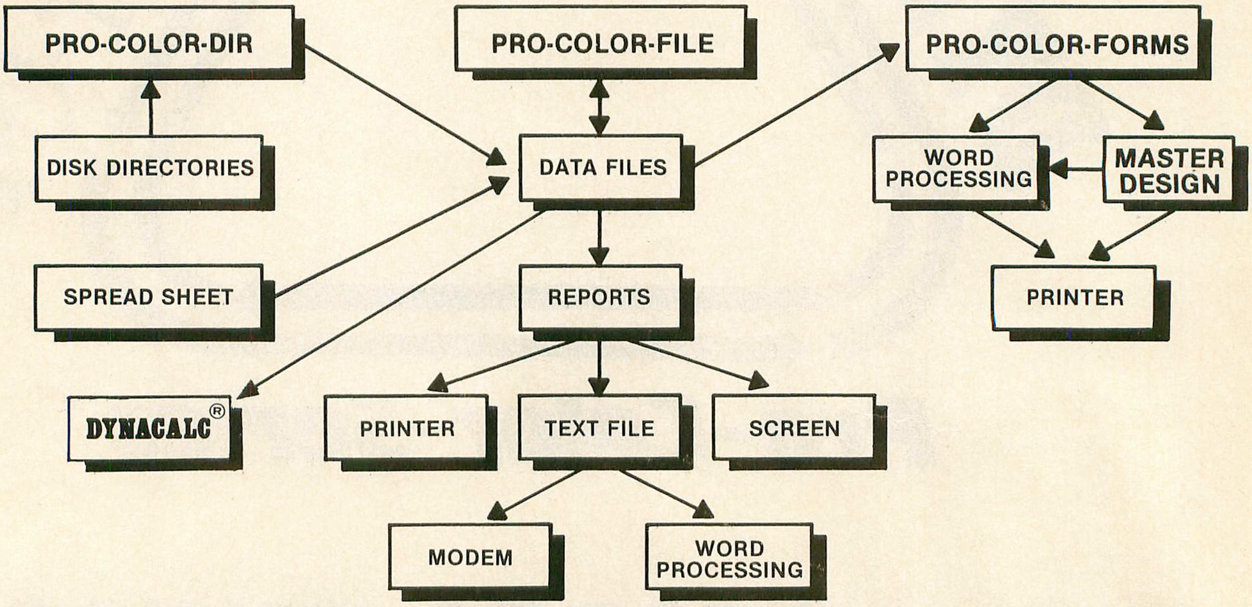
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MASTER DESIGN
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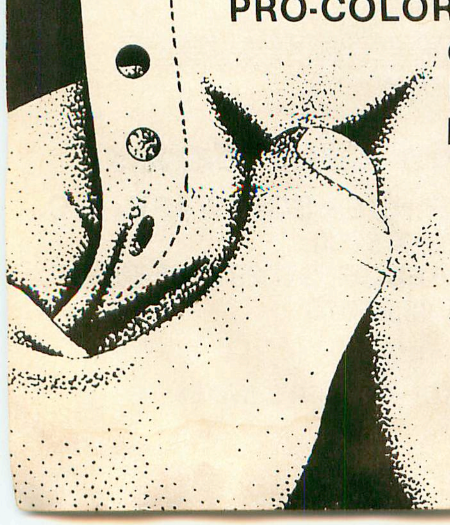

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MASTER DESIGN comes with its own screen dump routine which interfaces with all popular dot matrix printers that have dot addressable graphic ability.

See reviews in:
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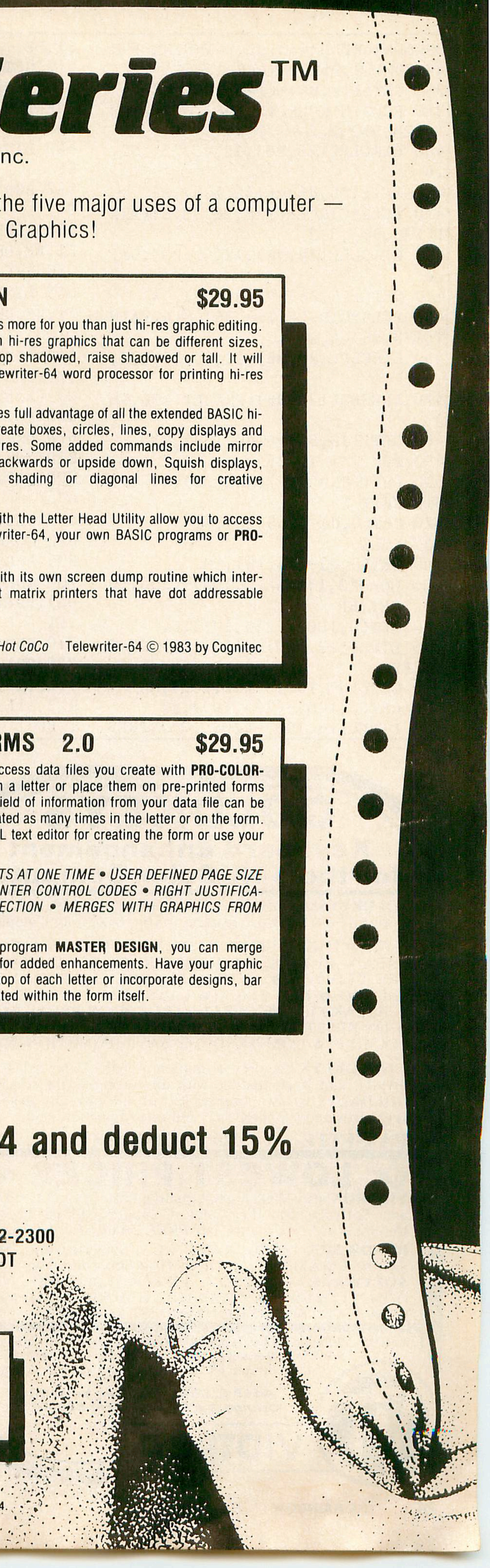

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```
DNR6DNR6R2DNR4BM132,96NR8ENR6ENR
4ER2BM132,96R2DNR4R2DR2U6L2
380 GET(116,84)-(140,108),P2
390 PCLS:CIRCLE(128,96),8,2:PAIN
T(128,96),2,2
400 CIRCLE(128,96),12,4,.25,.92,
.6
410 GET(116,84)-(140,108),P3
420 PCLS:CIRCLE(128,96),8,3:PAIN
T(128,96),3,3
430 CIRCLE(128,96),12,4,.25,.92,
.6
440 GET(116,84)-(140,108),P4
450 PCLS:CIRCLE(128,96),8,4:PAIN
T(128,96),4,4
460 CIRCLE(128,96),12,3,.25,.92,
.6
470 PRESET(120,96):PRESET(136,96
)
480 GET(116,84)-(140,108),P5
490 FOR T=1 TO 25
500 PSET(RND(255),RND(28),4)
510 NEXT T
520 GET(0,0)-(255,28),ST
530 PCLS
540 GET(0,0)-(24,18),CM
550 COLOR3,1:LINE(0,100)-(255,10
5),PSET,BF
560 GET(0,100)-(255,105),F1
570 LINE(112,100)-(144,105),PRES
ET,BF
580 GET(104,100)-(152,105),MH
590 GET(0,100)-(255,105),F2
600 LINE(176,100)-(208,105),PRES
ET,BF
610 GET(0,100)-(255,105),F3
620 LINE(48,100)-(80,105),PRESET
,BF
630 GET(0,100)-(255,105),F4
640 LINE(48,100)-(208,105),PSET,
BF
642 A$="C4M+40,+5BU5M-40,+5BU2R4
0"
644 LINE(104,100)-(144,105),PRES
ET,BF:DRAW"BM104,100;XA$;":GET(0
,100)-(255,105),F5
645 LINE(152,100)-(192,105),PRES
ET,BF:DRAW"BM152,100;XA$;":GET(0
,100)-(255,105),F6
646 LINE(56,100)-(96,105),PRESET
,BF:DRAW"BM56,100;XA$;":GET(0,10
0)-(255,105),F7
660 PUT(0,100)-(255,105),F1
670 DRAW"BM48,100C1NR160R2DNR156
R2DC2NR152R2DNR148R4DNR140BM80,1
00C3NR32DL2R36BM144,100NR32DL2R3
6"
680 GET(0,100)-(255,105),FB
690 GOSUB 4000
695 PCLS
700 COLOR 4,1:LINE(0,170)-(255,1
92),PSET,BF:PUT(0,165)-(255,170)
,F1
710 BN=-1:GOSUB 1400
720 DRAW"BM3,173C2"+L$(15)+L$(24
)+L$(25)+L$(7)+L$(5)+L$(14):COLO
R 2,1:LINE(65,173)-(253,179),PSE
T,BF
730 DRAW"BM3,182"+L$(19)+L$(3)+L
$(15)+L$(18)+L$(5):GET(65,182)-(
115,190),CI
740 DRAW"BM186,182"+L$(13)+L$(5)
+L$(14)+"BR8"+L$(12)+L$(5)+L$(6)
+L$(20)
750 ML=2:SC=5000:X=0:Y=81:WT=2:0
L=190
760 GOSUB 1800
770 GOSUB 1840
980 PMODE4,1:SCREEN1,1:PMODE3,1
990 GOTO 1040
1000 H=JOYSTK(0)
1030 IF H<45 THEN WT=2:GOTO 1060
1040 X=X+8:IF X>208 THEN GOSUB 1
400
1050 WT=WT+1:IF WT=5 THEN WT=1
1060 ON WT GOTO 1070,1080,1090,1
080
1070 PUT(X,Y)-(X+24,Y+18),M1:GOT
O 1100
1080 PUT(X,Y)-(X+24,Y+18),M2:GOT
O 1100
1090 PUT(X,Y)-(X+24,Y+18),M3
1100 IF Y>105 THEN GOSUB 2200 EL
SE GOSUB 2300
1110 P=PEEK(65280):IF P=126 OR P
=254 THEN GOSUB 1200
1120 OC=OC+1:IF OC>62 THEN GOSUB
 3000
1130 GOTO 1000
1200 IF JOYSTK(0)>45 THEN T=8 EL
SE T=0
1210 OY=Y
```

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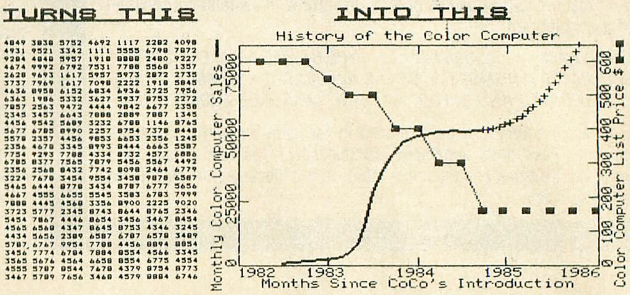

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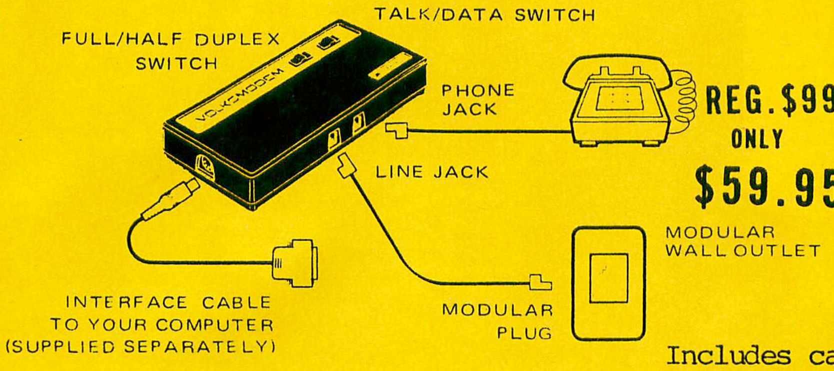

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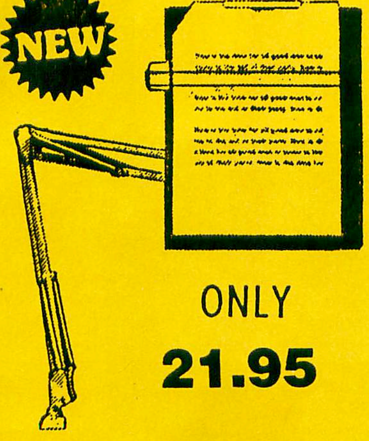

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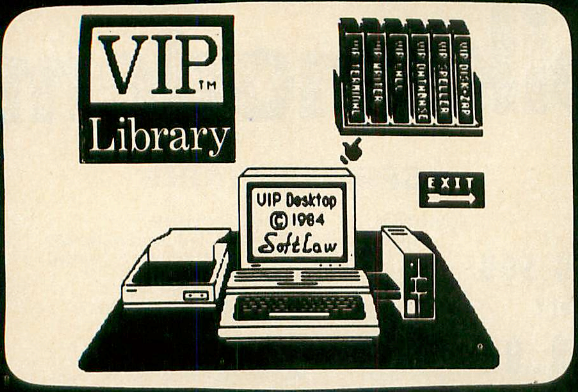

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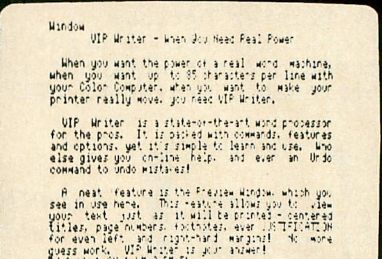

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printer really move, you need VIP Writer.

  VIP  Writer  is a state-of-the-art word processor
for the pros.  It is packed with commands, features
and options, yet it's simple to learn and use.  Who
else gives you  on-line  help,  and even  an  Undo
command to undo mistakes!

  A  neat  feature is the Preview Window, which you
see in use here.   This feature allows you to  view
your  text  just  as  it will be printed - centered
titles, page numbers, footnotes, even JUSTIFICATION
for even left  and  right-hand  margins!  No  more
guess work.  VIP Writer is your answer!
PN 1 LN 1 CN 1 LM 0 FM 51
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Radio Shack Catalog No. 90-0142
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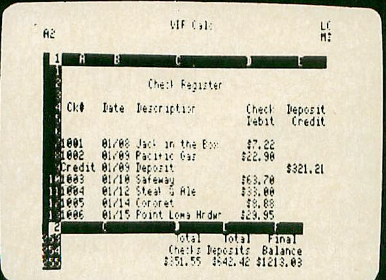
64K Required for math package & mail merge



```
 A2                  VIP Calc                     LC
                                                  M:
 1   A      B          C               D        E
 1
 2               Check Register
 3
 4 Ck#     Date   Description        Check    Deposit
 5                                   Debit     Credit
 6
 7 1001    01/08 Jack in the Box      $7.22
 8 1002    01/09 Pacific Gas         $22.90
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53                     Total     Total     Final
54                     Checks   Deposits   Balance
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VIP Calc™

"MORE USABLE FEATURES" FEB 1985 "RAINBOW"

VIP Calc™ is truly the finest and easily the most powerful electronic worksheet and financial modeling program available for the Color Computer. Now every Color Computer owner has access to a calculating and planning tool better than VisiCalc™, containing all its features and commands and then some, WITH USABLE DISPLAYS.

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Radio Shack Catalog No. 90-0143
64K (Comes with tape & disk) $69.95

VIP Programs do not work with JDOS

VIP Terminal™

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For your important communication needs you've got to go beyond software that only lets you chat. You need a smart terminal so that you can send and receive programs, messages, even other **VIP Library**™ files. **VIP Terminal**™ has "more features than communications software for CP/M, IBM and CP/M 86 computers." Herb Friedman, Radio Electronics, February 1984.

FEATURES: Choice of 8 hi-res lowercase displays * Memory-Sense with BANK SWITCHING for full use of workspace * Selectively print data at baud rates from 110 to 9600 * Full 128 character ASCII keyboard * Automatic graphic mode * Word mode (word wrap) for unbroken words * Send and receive **Library** files, Machine Language & BASIC programs. Duplex: Half/Full/Echo, Word length: 7 or 8, Parity: Odd/Even or None, Stop Bits: 1-9 * Local linefeeds to screen * Save and load ASCII files, Machine Code & BASIC programs * Lowercase masking * 10 Keystroke Multiplier (MACRO) buffers to perform repetitive pre-entry log-on tasks and send short messages * Programmable prompt or delay for send next line * Selectable character trapping * Send up to ten short messages (KSMs), each up to 255 characters long, automatically, to save money when calling long distance. Recommended baud rates are 110 and 300.

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32K (Comes with tape & disk) $49.95
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Radio Shack Catalog No. 90-0144
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VIP™
Technologies

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The HJL-57 Keyboard

Now available for all models, including CoCo 2.

Radio Shack
TRS-80
COLOR COMPUTER

Compare it with the rest. Then, buy the best.

If you've been thinking about spending good money on a new keyboard for your Color Computer, why not get a good keyboard for your money?

Designed from scratch, the HJL-57 Professional Keyboard is built to unlock ALL the potential performance of your Color Computer. Now, you can do real word processing and sail through lengthy listings...with maximum speed; minimum errors.

At $79.95, the HJL-57 is reasonably priced, but you can find other CoCo keyboards for a few dollars less. So, before you buy, we suggest that you compare.

Compare Design.

The ergonomically-superior HJL-57 has sculptured, low profile keycaps; and the three-color layout is identical to the original CoCo keyboard.

Compare Construction.

The HJL-57 has a rigidized aluminum baseplate for solid, no-flex mounting. Switch contacts are rated for 100 million cycles minimum, and covered by a spill-proof membrane.

Compare Performance.

Offering more than full-travel, bounce-proof keyswitches, the HJL-57 has RFI/EMI shielding that eliminates irritating noise on displays; and four user-definable function keys (one latchable), specially-positioned to avoid inadvertent actuation.

Free Function Key Program

Your HJL-57 kit includes usage instructions and decimal codes produced by the function keys, plus a free sample program that defines the function keys as follows: F1 = Screen dump to printer. F2 = Repeat key (latching). F3 = Lower case upper case flip (if you have lower case capability). F4 = Control key; subtracts 64 from the ASCII value of any key pressed. Runs on disc or tape; extended or standard Basic.

Compare Installation.

Carefully engineered for easy installation, the HJL-57 requires no soldering, drilling or gluing. Simply plug it in and drop it right on the original CoCo mounting posts. Kit includes a new bezel for a totally finished conversion.

Compare Warranties.

The HJL-57 is built so well, it carries a full, one-year warranty. And, it is sold with an exclusive 15-day money-back guarantee.

Compare Value.

You know that a bargain is a bargain only so long as it lasts. If you shop carefully, we think you will agree...The HJL-57 is the last keyboard your CoCo will ever need. And that's **real** value.

Order Today.

Only $79.95, the HJL-57 is available for immediate shipment for either the original Color Computer (sold prior to October, 1982) or the F-version and TDP-100 (introduced in October, 1982), and the new 64K CoCo. **Now also available for CoCo 2.**

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PRODUCTS

Div. of Touchstone Technology Inc.
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Rochester, New York 14624
Telephone: (716) 235-8358

Ordering Information: Specify model (Original, F-version, or CoCo 2). Payment by C.O.D., check, MasterCard or Visa . Credit card customers include complete card number and expiration date. Add $2.00 for shipping ($3.50 for Canada). New York state residents add 7% sales tax.
Dealer inquiries invited.

```
1220 FOR C=1 TO 3
1230 PUT(X,Y)-(X+24,Y+18),CM
1240 Y=Y-4:X=X+T:IF X>208 THEN G
OSUB 1400:Y=OY:GOTO 1000
1250 PLAY"L25502CE"
1260 PUT(X,Y)-(X+24,Y+22),MJ
1270 NEXT C
1280 FOR C=1 TO 3
1290 PLAY"AF"
1300 PUT(X,Y)-(X+24,Y+18),CM
1310 Y=Y+4:X=X+T:IF X>208 THEN G
OSUB 1400:Y=OY:GOTO 1000
1320 IF Y=OY THEN 1340
1330 PUT(X,Y)-(X+24,Y+22),MJ
1340 NEXT C
1350 OC=OC+6
1360 RETURN
1400 PCOPY5TO1:PUT(0,0)-(255,28)
,ST
1405 BN=BN+1:IF BN=200 THEN 5000
 ELSE IF BN/20=INT(BN/20) AND BN
<>0 THEN 2600
1410 R=RND(20)*8+40
1420 T=RND(6):IF T=BT THEN 1420
ELSE BT=T
1430 ON BT GOTO 1440,1450,1460,1
470,1480,1450,1470
1440 PUT(R,2)-(R+24,26),P1:GOTO
1490
1450 PUT(R,2)-(R+24,26),P2:GOTO
1490
1460 PUT(R,2)¬(R+24,26),P3:GOTO
1490
1470 PUT(R,2)-(R+24,26),P4:GOTO
1490
1480 PUT(R,2)-(R+24,26),P5:GOTO
1490
1490 DRAW"BM0,40C3"+LS$(RND(5))
1500 PUT(X,Y)-(X+24,Y+18),CM
1510 X=0
1530 IF Y>105 THEN 1630
1540 ON BT GOTO 1550,1560,1570,1
580,1590,1600
1550 PUT(0,100)-(255,105),F2:GOT
O 1610
1560 PUT(0,100)-(255,105),F3:GOT
O 1610
1570 PUT(0,100)-(255,105),F4:GOT
O 1610
1580 PUT(0,100)-(255,105),F5:GOT
O 1610
1590 PUT(0,100)-(255,105),F6:GOT
O 1610
1600 PUT(0,100)-(255,105),F7
1610 PUT(0,165)-(255,170),F1
1620 GOTO 1710
1630 ON BT GOTO 1640,1650,1660,1
670,1680,1690
1640 PUT(0,165)-(255,170),F8:GOT
O 1700
1650 PUT(0,165)-(255,170),F9:GOT
O 1700
1660 PUT(0,165)-(255,170),F0:GOT
O 1700
1670 PUT(0,165)-(255,170),FA:GOT
O 1700
1680 PUT(0,165)-(255,170),FB:GOT
O 1700
1690 PUT(0,165)-(255,170),F1
1700 PUT(0,100)-(255,105),F1
1710 X=0
1720 RETURN
1800 COLOR4,1
1805 IF ML=-1 THEN 5000
1810 LINE(172,182)-(178,190),PSE
T,BF
1820 DRAW"BM173,182C2"+N$(ML)
1830 RETURN
1840 PUT(65,182)-(115,190),CI
1850 A$=STR$(SC)
1860 FOR T=2 TO LEN(A$)
1870 DRAW"BM"+STR$(49+T*8)+",182
C2"+N$(VAL(MID$(A$,T,1)))
1880 NEXT T
1890 RETURN
2000 PUT(X,Y)-(X+24,Y+18),CM
2010 SC=SC-250:GOSUB 1840
2020 IF X>80 AND X<128 THEN X=11
6
2030 IF X>128 THEN X=180
2040 IF X<80 THEN X=48
2050 FOR Y=81 TO 143 STEP 2
2060 PUT(X,Y)-(X+24,Y+18),M2
2070 LINE(X+8,Y-3)-(X+24,Y-1),PR
ESET,BF
2080 NEXT Y
2090 Y=146
2100 LINE(X,Y)-(X+24,Y-3),PRESET
,BF
2110 IF SC=0 THEN 5000
2120 GOTO 1000
2200 IF PPOINT(X+18,Y+19)=7 THEN
 RETURN
2210 GOTO 2400
2300 IF BT>3 THEN 2200
2310 IF PPOINT(X+18.Y+19)=7 THEN
 RETURN
2320 GOTO 2000
2400 PUT(X,Y)¬(X+24,Y+18),M2
2405 FOR T=0 TO 17
2410 GET(X,Y+T)-(X+24,Y+17),DM
2420 LINE(X,Y+T)-(X+24,Y+T),PRES
ET
2430 PUT(X,Y+T+1)-(X+24,Y+18),DM
2440 NEXT T
2450 DRAW"BM"+STR$(X+8)+","+STR$
(Y+18)+"C4NR16U12E4R8F4D12":PAIN
T(X+12,Y+17),4,4:PMODE4,1:DRAW"B
M"+STR$(X+10)+","+STR$(Y+6)+"CON
D6R2FDGLF2DBR3R2LU6LR2BR3ND6R2FD
GL2":PMODE3,1
2460 ML=ML-1:GOSUB 1800
2470 PLAY"T2L401CP96CL3FL4P24CFA
P64CFAP64CFAFAO2CO1AFCP64CP96CL3
F"
2474 LINE(X,Y)-(X+24,Y+18),PRESE
T,BF
2475 X=0
2480 GOTO 1000
2600 PUT(X,Y)-(X+24,Y+18),CM:PCO
PY4TO5:PCLS
2610 COLOR2,1
2620 FOR T=0 TO 9
2630 LINE(T,T)-(256-T,192-T),PSE
T,B
2635 NEXT T
2640 DRAW"BM68,26C4"+L$(3)+L$(15
)+L$(14)+L$(7)+L$(18)+L$(1):DRAW
 L$(4)+L$(21)+L$(12)+L$(1)+L$(20
)+L$(9)+L$(15)+L$(14)+L$(19)+"BD
9BL4M68,35"
2650 DRAW"BM46,50C3"+L$(25)+L$(1
5)+L$(21)+"BR8"+L$(8)+L$(1)+L$(2
2)+L$(5)+"BR8":DRAW L$(18)+L$(5)
+L$(1)+L$(3)+L$(8)+L$(5)+L$(4)+"
BR8":DRAW L$(20)+L$(8)+L$(5)
2660 A$=STR$(BN)
2670 FOR T=2 TO LEN(A$)
2680 DRAW"BM"+STR$(30+T*8)+",60"
+N$(VAL(MID$(A$,T,1)))
2690 NEXT T
2700 DRAW"BM"+STR$(LEN(A$)*8+38)
+",60"+L$(20)+L$(8)+"BR8"
2710 DRAW L$(2)+L$(15)+L$(1)+L$(
18)+L$(4)+"BD6RULDBR4BU6":DRAW L
$(25)+L$(15)+L$(21)+"BR8"+L$(7)+
L$(5)+L$(20)+"BR8"
2720 DRAW L$(1)+"BM46,70"+N$(5)+
"BR8BU6"+L$(15)+L$(15)+L$(15)+"B
R8":DRAW L$(16)+L$(15)+L$(9)+L$(
14)+L$(20)+"BR8"
2730 DRAW L$(2)+L$(15)+L$(14)+L$
(21)+L$(19)+"BR8":DRAW L$(16)+L$
(12)+L$(21)+L$(19)
2740 DRAW"BM46,80"+L$(25)+L$(15)
+L$(21)+"BR8":DRAW L$(3)+L$(8)+L
$(15)+L$(15)+L$(19)+L$(5)+"BR8":
DRAW L$(20)+L$(8)+L$(5)+"BR8"
2750 DRAW L$(12)+L$(5)+L$(22)+L$
(5)+L$(12)+"BR8":DRAW"BM46,90"+L
$(20)+L$(15)+"BR8":DRAW L$(16)+L
$(12)+L$(1)+L$(3)+L$(5)+"BR8"
2760 DRAW L$(25)+L$(15)+L$(21)+L
$(18)+"BR8":DRAW L$(13)+L$(1)+L$
(14)+"BR4BD6RUL"
2770 DRAW"BM68,110C4"+L$(1)+"M+4
,+3M-4,+3BR12BU6C3"+L$(6)+L$(15)
+L$(18)+"BR8":DRAW L$(20)+L$(15)
+L$(16)+"BR8":DRAW L$(12)+L$(5)+
L$(22)+L$(5)+L$(12)
2780 DRAW"BM68,125C4"+L$(2)+"M+4
,+3M-4,+3BR12BU6C3"+L$(6)+L$(15)
+L$(18)+"BR8":DRAW L$(2)+L$(15)+
L$(20)+L$(20)+L$(15)+L$(13)+"BR8
":DRAW L$(12)+L$(5)+L$(22)+L$(5)
+L$(12)
2790 A$=INKEY$:IF A$="" THEN 279
0
2792 IF A$="A" THEN Y=81:GOTO 28
00 ELSE IF A$="B" THEN Y=146:GOT
O 2800 ELSE 2790
2800 PCLS
2810 PCOPY5TO4:PCOPY1TO5
2820 SC=SC+5000:GOSUB 1840
2830 GOTO 1410
3000 OC=0:OL=OL-2
3010 COLOR4,1:LINE(65+OL,172)-(6
5+OL,180),PSET
3020 IF OL<1 THEN 5000
3030 RETURN
4000 PMODE3,1:PCLS
4005 PCLS2
4007 FOR T=1 TO 20 STEP 2:LINE(2
28-T,30+T)-(0,30+T),PRESET:LINE(
228-T,80+T)-(0,80+T),PRESET:NEXT
 T
4010 DRAW"BM68,50C4E20R60G20L60R
10NE5R10E10NL5E10L20BD5BR2R6BR12
BU5R20G20L10BE5E15R17BG5G15R6BE5
E15"
```

```
4020 DRAW"BM148,50C4E20R60G20L40
E15NL10NE5G5L10G10L10BR30BE5E10B
E5R30G10NL5G10L10NE5L10E20BD5BR2
R6"
4030 DRAW"BM27,100E10L5E10R80G20
L60E10NE10L5G10L10BU20BR25NG5R20
BG5NG10BE5R20NG15BR20BG15G5R10E1
0NL5E10L20NG20L20NG20BR22BD5R6"
4040 DRAW"BM128,100E20R10G15R10N
G5R5E10L5E5R60G7NL10G6NL10G7L20E
15NL10NE5G5L10G10L10NE20E5L5E10R
5G15L40"
4050 PAINT(0,0),1,4
4051 PMODE4,1:SCREEN1,1:PMODE3,1
4055 FOR TT=1 TO 2
4060 FOR T=0 TO 208 STEP 8
4065 PLAY"L12802CE"
4070 A=A+1:IF A>4 THEN A=1
4080 ON A GOTO 4090,4100,4110,41
00
4090 PUT(T,120)-(T+24,138),M1:GO
TO 4120
4100 PUT(T,120)-(T+24,138),M2:GO
TO 4120
4110 PUT(T,120)-(T+24,138),M3
4120 COLOR3,1:LINE(T,130+TT*9)-(
T+24,139+TT*9),PSET,BF
4125 NEXT T
4126 LINE(200,130+TT*9)-(255,139
+TT*9),PSET,BF
4130 LINE(200,120)-(255,138),PRE
SET,BF
4132 ON TT GOSUB 4140,4150
4135 NEXT TT
4137 GOTO 4160
4140 DRAW"BM56,141C1"+L$(2)+L$(2
5)+"BR8"+L$(13)+L$(9)+L$(3)+L$(8
)+L$(1)+L$(5)+L$(12)+"BR8":DRAW
L$(18)+L$(5)+L$(16)+L$(1)+L$(19)
+L$(25):RETURN
4150 DRAW"BM34,150C1"+L$(16)+L$(
18)+L$(5)+L$(19)+L$(19)+"BR8":DR
AW L$(1)+L$(14)+L$(25)+"BR8"+L$(
11)+L$(5)+L$(25)+"BR8":DRAW L$(2
0)+L$(15)+"BR8":DRAW L$(2)+L$(5)
+L$(7)+L$(9)+L$(14):RETURN
4160 IF INKEY$="" THEN 4160
4170 RETURN
5000 IF BN=200 THEN 6000
5010 COLOR3,1:LINE(88,65)-(168,7
5),PSET,B:PAINT(128,70),4,3
5020 DRAW"BM92,67C2"+L$(7)+L$(1)
+L$(13)+L$(5)+"BR8"+L$(15)+L$(22
)+L$(5)+L$(18)
5030 FOR T=1 TO 2500:NEXT T
5040 GOTO 7000
6000 GOSUB 1400
6010 PUT(0,100)-(255,105),F1
6020 PUT(0,165)-(255,170),F1
6030 DRAW"BM130,99C4U10L20H10U10
E10R60F10R20E10R45BD30L5D10L20U1
0L20H10L20G10L20D10L20"
6040 PAINT(130,80),2,4
6050 DRAW"BM130,106C4R20D28R20F1
0R20E10R20U28R20D28R5BD30L45H10L
20G10L60H10U10E10R20U28"
6060 PAINT(160,140),2,4
6070 DRAW"BM64,99C4NR24ENR22ENR2
0ENR18R4C2M+6,-12NM+6,+12E8NU4G1
6NL4U16NR16F4"
6080 COLOR4,1:LINE(0,171)-(255,1
92),PSET,BF
6090 DRAW"BM0,172C1"+L$(25)+L$(1
5)+L$(21)+"BR8":DRAW L$(13)+L$(1
)+L$(4)+L$(5)+"BR8":DRAW L$(9)+L
$(20)+"BR8"
6100 DRAW L$(20)+L$(15)+"BR8":DR
AW L$(20)+L$(8)+L$(5)+"BR8":DRAW
 L$(2)+L$(1)+L$(19)+L$(5)+"BR8"
6110 DRAW L$(1)+L$(14)+L$(4)+"BR
8":DRAW"BM0,180"+L$(25)+L$(15)+L
$(21)+"BR8"
6120 DRAW L$(23)+L$(15)+L$(14)+"
BR8":DRAW L$(20)+L$(8)+L$(5)+"BR
8":DRAW L$(7)+L$(1)+L$(13)+L$(5)
+"BD6UBU5BR8"
6130 DRAW L$(14)+L$(9)+L$(3)+L$(
5)+"BR9":DRAW L$(10)+L$(15)+L$(2
)+"BR4D3BD2DBR4UBU2U3BR4D3BD2DBR
4UBU2U3"
6140 PMODE4,1
6150 DRAW"BM63,50C1"+L$(25)+L$(1
5)+L$(21)+L$(18)+"BR8":DRAW L$(1
9)+L$(3)+L$(15)+L$(18)+L$(5)
6160 SC=SC+5000+OL*1000+ML*15000
6170 A$=STR$(SC)
6180 FOR T=2 TO LEN(A$)
6190 DRAW"BM"+STR$(134+T*8)+",50
"+N$(VAL(MID$(A$,T,1)))
6200 NEXT T
6210 FOR T=1 TO 10000:NEXT T
6220 PMODE4,1:SCREEN1,1:PMODE3,1
:GOTO 7000
7000 FOR T=1 TO 10
7010 IF SC>=HS(T) THEN X=T:GOTO
7500
7020 NEXT T
7030 GOTO 8000
7500 FOR T=9 TO X STEP -1
7510 HS(T+1)=HS(T)
7515 HS$(T+1)=HS$(T)
7520 NEXT T
7525 HS$(X)=""
7530 HS(X)=SC
7535 HN=X
7540 PCLS
7550 DRAW"BM15,10C3"+L$(25)+L$(1
5)+L$(21)+L$(18)+"BR8":DRAW L$(1
9)+L$(3)+L$(15)+L$(18)+L$(5)+"BR
8":DRAW L$(9)+L$(19)+"BR8"
7560 DRAW L$(15)+L$(14)+L$(5)+"B
R8":DRAW L$(15)+L$(6)+"BR8":DRAW
 L$(20)+L$(8)+L$(5)+"BR8"
7570 DRAW L$(20)+L$(15)+L$(16):D
RAW"BM15,20"+L$(20)+L$(5)+L$(14)
+"BR8"
7580 DRAW L$(20)+L$(15)+L$(4)+L$
(1)+L$(25)+"D3BD2DBR8BU6":DRAW L
$(16)+L$(12)+L$(5)+L$(1)+L$(19)+
L$(5)+"BR8"
7590 DRAW L$(5)+L$(14)+L$(20)+L$
(5)+L$(18)+"BR8":DRAW L$(25)+L$(
15)+L$(21)+L$(18)+"BR8"
7600 DRAW"BM15,30"+L$(9)+L$(14)+
L$(9)+L$(20)+L$(9)+L$(1)+L$(12)+
L$(19)+"BD6U"
7610 FOR T=0 TO 12
7620 DRAW"BM"+STR$(16+T*18)+",50
C4"+L$(T+1)
7630 DRAW"BM"+STR$(16+T*18)+",70
"+L$(T+14)
7640 NEXT T
7650 DRAW"BM16,90"+L$(5)+L$(14)+
L$(20)+L$(5)+L$(18)
7660 DRAW"BM202,90"+L$(3)+L$(12)
+L$(5)+L$(1)+L$(18)
7665 X=16
7668 CT=0
7670 H=JOYSTK(0):V=JOYSTK(1)
7675 IF V>42 THEN 7750
7680 IF H>50 THEN X=X+18:IF X>23
2 THEN X=232
7690 IF H<14 THEN X=X-18:IF X<16
 THEN X=16
7700 IF V<21 THEN Y=48 ELSE Y=68
7710 COLOR2,1:LINE(X-4,Y)-(X+12,
Y+12),PSET,B:LINE(X-4,Y)-(X+12,Y
+12),PRESET,B
7715 P=PEEK(65280):IF P=126 OR P
=254 THEN 7730
7720 GOTO 7670
7730 A=INT((X-16)/18)+1:IF Y=68
THEN A=A+13
7732 HS$(HN)=HS$(HN)+L$(A)
7734 DRAW"BM100,120C3S8"+HS$(HN)
+"S4"
7736 PLAY"L25505BGFDC"
7737 CT=CT+1:IF CT=5 THEN CT=0:G
OTO 8000
7738 GOTO 7680
7750 H=JOYSTK(0):V=JOYSTK(1)
7760 IF V<43 THEN X=16:GOTO 7670
7780 IF H<31 THEN X=14 ELSE X=20
0
7790 COLOR2,1:LINE(X,88)-(X+42,9
8),PSET,B:LINE(X,88)-(X+42,98),P
RESET,B
7800 P=PEEK(65280):IF P=126 OR P
=254 THEN 7820
7810 GOTO 7750
7820 IF H<31 THEN 8000 ELSE CT=0
:HS$(HN)="":GOTO 7540
8000 PCLS
8010 COLOR3,1:LINE(48,20)-(208,1
30),PSET,B
8020 LINE-(48,10),PSET,B
8030 DRAW"BM104,12C4"+L$(20)+L$(
15)+L$(16)+"BR8"+N$(1)+"BR6BU6"+
N$(0)
8040 FOR T=1 TO 10
8050 DRAW"C2BM64,"+STR$(13+T*10)
+HS$(T)
8060 A$=STR$(HS(T)):IF HS(T)=0 T
HEN 8080 ELSE FOR TT=2 TO LEN(A$
):DRAW"BM"+STR$(116+TT*8)+","+ST
R$(13+T*10)+N$(VAL(MID$(A$,TT,1)
)):NEXT TT
8080 NEXT T
8090 DRAW"BM50,140C4"+L$(1)+L$(1
4)+L$(15)+L$(20)+L$(8)+L$(5)+L$(
18)+"BR8":DRAW L$(7)+L$(1)+L$(13
)+L$(5)+"BR4G2D2F2BR4BU6":DRAW L
$(25)+"BR4M-4,+6BR8BU6"+L$(14)+"
F2D2G2BR8BU5UR4D3L2BD2D"
8100 A$=INKEY$:IF A$="" THEN 810
0
8110 IF A$="Y" THEN CLS:PRINT:GO
TO 40 ELSE IF A$="N" THEN 8120 E
LSE 8100
8120 POKE 65494,0
```

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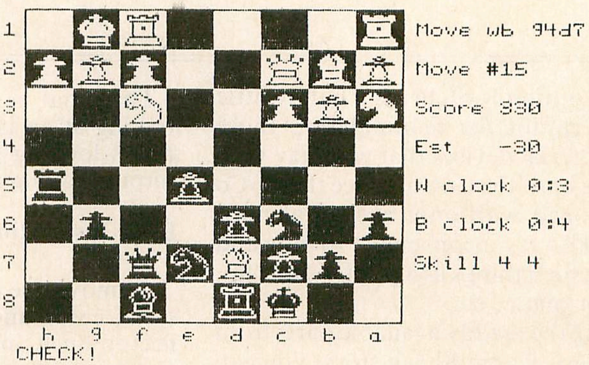

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Move #15
Score 330
Est   -30
W clock 0:3
B clock 0:4
Skill 4 4
CHECK!
```

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HARDWARE PROJECT

Routing Switcher Keeps the Talk Interchanging

By Michael J. Lill

Routing Switcher is a handy little circuit for manipulating those serial devices that you may wish to hang onto the CoCo. Since the CoCo is equipped with only one serial port, I found it very inconvenient to plug and unplug such things as a printer, modem, another micro, etc.

Using the readily available parts from your local Radio Shack store, you can assemble this in one night. It is easy enough for my 8-year-old to send his signals wherever he wishes!

Parts List

5-275-1386 2 pole, 6 position rotary switch	$1.19 ea.
5-274-415 knobs, 2 pkgs.	$1.59 pkg.
1-270-224 box, plastic	$2.99 ea.
5-274-018 jack, 4-pin in-line DIN jack	$1.49 ea.
1-26-3020 CoCo serial cable	$4.95 ea.

Miscellaneous: Solder and stranded hook-up wire.

(Michael Lill is married and has four children. He received a background in electronics while serving in the U.S. Navy. He has about 20 years experience in electronics and is self-taught on the computer.)

The goal is to keep all outputs looking at an input only as well as all inputs looking at an output, *never* an output looking at an output.

Basic Instructions

Remove one male connector from the serial cable and solder a female connector on it, pin for pin. This makes a wonderful extension cable. If you have four-conductor cable, make five lengths approximately six inches each, and attach the four remaining female connectors and the one remaining male connector (one to each piece of cable). I didn't have any four-conductor cable, so I purchased an extra CoCo cable which gave me some spare parts for later.

The wiring is simple and straightforward, and due to the frequencies at which serial I/O works, the layout is not critical. With the arrangement shown, a micro may "talk" to another micro at the turn of a switch. The required turnover is prewired for the proper directions between CPUs. More than one micro may be active in the same box. Micro #2 may be online with the modem and micro #1 could be busy on the printer. Also, micro #1 can monitor switches 1-4, just for an extra feature.

There is room for a sixth switch which would allow one additional CPU or peripheral to be added to the system — however, not in the box as listed for parts.

Please note, the CD "carrier detect" line is common to all units except the printer. This was done on purpose in case there happen to be two modems used instead. Four-pin sockets and jack could have been used instead of the "pigtails" of mine, however, they were not available at the Radio Shack store where I bought the materials.

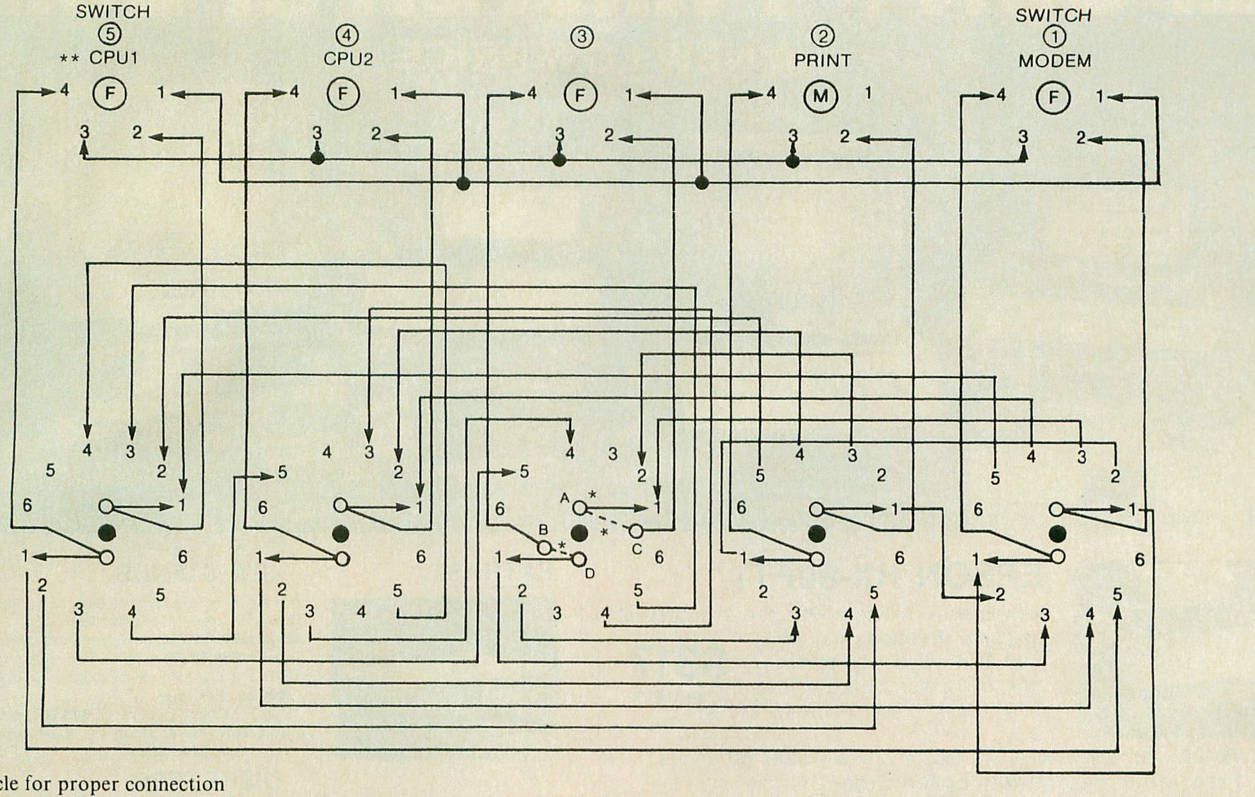
Also note, switch #3 is not shown connected. If point 'A' is tied to point 'C' and point 'B' to point 'D,' now this port is ready for another micro; alternately, if 'A' is tied to 'B' and 'C' is tied to 'D,' we now have a peripheral port. Also, keep in mind the note on the carrier detect line.

To use the switcher, simply have the CPU look at, for instance, the printer and then have the printer look at that CPU. If the modem was looking at that CPU, it would see nothing, because we now have the CPU busy with the printer.

All this flexibility is available by using the standard Radio Shack cables, except the one extension we made. (I made a 20-foot extension for my printer just to get it away from my ears!)

Figure 1

ROUTING SWITCHER
— 232 —



*See article for proper connection

**CPU#1 can monitor other outputs with "-J-" Jumpers as shown

Drawing is from connection side

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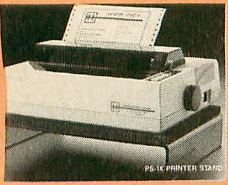

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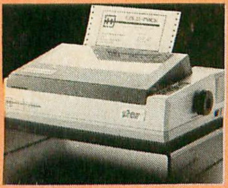

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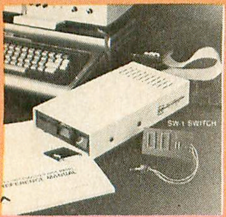

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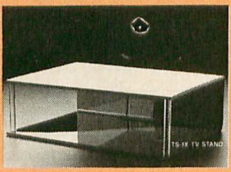

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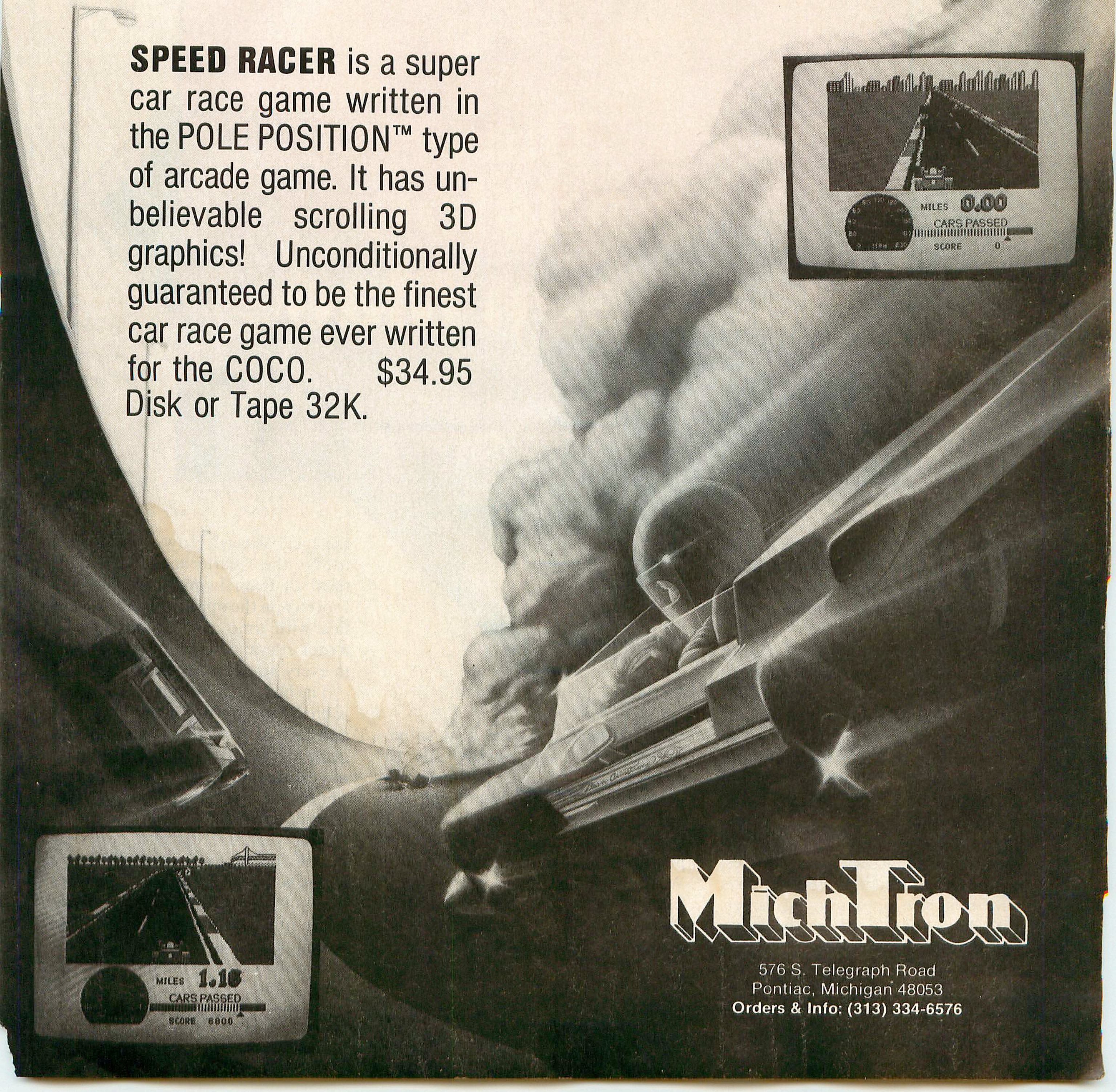
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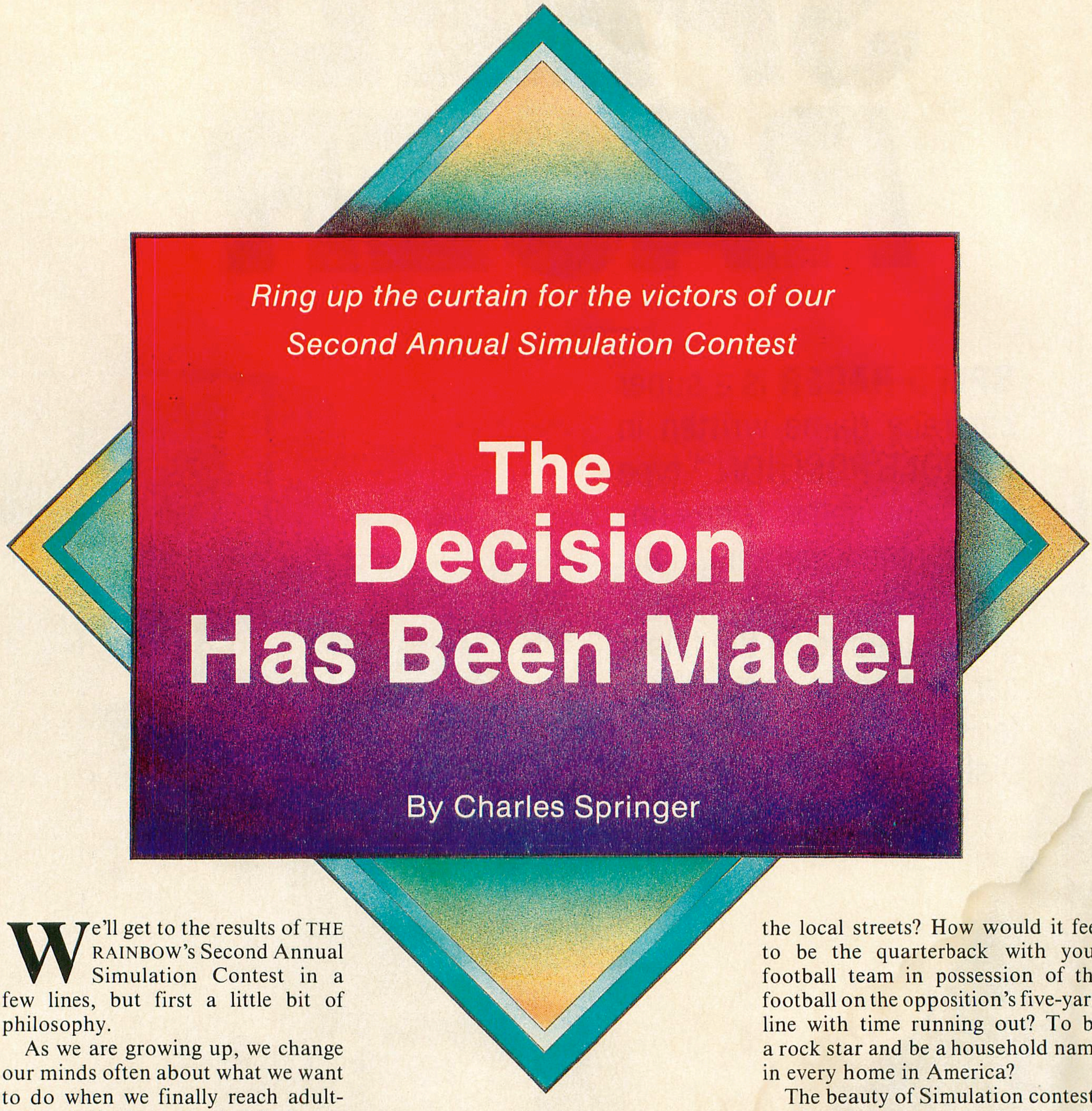

Ring up the curtain for the victors of our Second Annual Simulation Contest

The Decision Has Been Made!

By Charles Springer

We'll get to the results of THE RAINBOW's Second Annual Simulation Contest in a few lines, but first a little bit of philosophy.

As we are growing up, we change our minds often about what we want to do when we finally reach adulthood. A fireman one day, a doctor the next. Two days later, we've changed our minds completely and want to be in the circus or fly an airplane or be a movie star.

That's the way it used to be, anyway. Today's youngsters want to be astronauts, professional athletes, computer technicians. Some boys have their eye on a nursing career. Girls have their sights set on being president of the company.

Somewhere along the way, something often happens or fails to happen, and we end up wondering what it would be like doing this job or that one. More often, perhaps, we wonder why persons in certain positions make the decisions they do. Wouldn't it be nice to be governor for a few days and send out orders to apply some obviously needed asphalt to those gaping potholes in the local streets? How would it feel to be the quarterback with your football team in possession of the football on the opposition's five-yard line with time running out? To be a rock star and be a household name in every home in America?

The beauty of Simulation contests is that through the magic of CoCo and the skills of some talented and imaginative programmers, the judges are treated to some enviable experiences as they wade through the piles of entries.

This year, for example, we were put in the position of a negotiator trying to preserve the peace between the most powerful nations on earth, preventing head-on collisions between onrushing freight trains,

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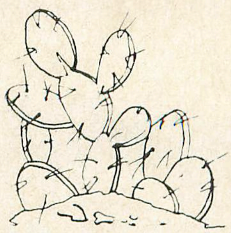

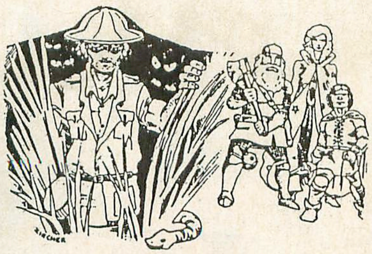

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The game itself is a work of art in every way. The puzzles are fun and challenging, you can use complete sentences, abbreviations, short phrases, and there are several milestones on the way to success. The whole game is done in full color highest-resolution graphics. Of course you can save the game in progress.

TO PRESERVE QUANDIC, you must find and return the missing piece of the time machine, and the clock is running . . . If you think you are ready for the best graphics adventure ever written for the Color Computer, don't miss **TO PRESERVE QUANDIC.** Packaged on two disks in a quality vinyl library case. Requires 32K and 1 disk drive. If you don't have a disk drive, it will be worth buying one just for this game. **$39.95**

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unlocking the secret combination to a time bomb planted by an international terrorist organization, trying to rid an apartment house of ghosts and going for Olympic gold in the decathlon events. Then there were the expected outerspace entries with some unexpected challenges.

We were tested in football, basketball and hockey. We put the gloves on and boxed a few rounds, even got into the ring with some of the most monstrous wrestlers you ever saw (and, believe me, I will never again say pro wrestling is a farce). We traveled in all kinds of machines to far-away places where extreme temperatures were the norm.

But most of all, we had fun. We were challenged. We were delighted by the programming innovations that were unveiled in in some of the Simulations. Even amazed, sometimes.

Our thanks to all of you who participated for making the contest another great one. Everybody wins, of course, because many of the entries will be published in our second *Rainbow Book of Simulations* later this year.

We're getting to the contest winners, but first a reminder about the judges' considerations for determining the very best. We were looking first for well-organized entries which simulated realistic situations. Why try to simulate something that no one is likely to have or ever will experience? That's more appropriate for Adventure contests.

We were looking for originality. That's a large part of the fun of owning a Color Computer, discovering the new and different things that CoCo makes possible. Many CoCo owners we know never run the same program more than once or twice. They thrive on new challenges.

Graphics also were a major consideration. The days are fading fast when CoCo users will be content with black on green screens for all except the most vital utility programs.

Other considerations included sound effects, grammar and spelling (CoCo's an educational tool, remember), ease of loading, clarity of instructions and documentation, level of challenge and just plain old enjoyment.

So there you have it: a little philosophy, some nostalgia, some personal prejudices and the official guidelines.

Now for the news you've been waiting for. In keeping with a tradition started by the Miss America contest and THE RAINBOW's adherence thereto, the runners-up are listed first (of course, if you just can't wait to discover the grand prize winners, you can read ahead a few paragraphs; we'll be waiting for you).

The runners-up awards:

The Banging On The Keyboard Can Be Hazardous To CoCo's Health Award goes to Curtis Boyle of Saskatoon, Saskatchewan, for his excellent version of *Olympics*. It includes a torch-lighting ceremomy for starters, and you must qualify for each of 10 rigorous decathlon events in order to win the gold medal. It requires a high level of dexterity and lightning quick speed with the index fingers.

The Gorgeous George Award goes to Brian Maiorano of Wilmington, Del., for his *Pro Wrestling* entry. The special graphics effects are superb and the grappling is furious and often hilarious, making it extra fun to play. He also introduces a few new moves, such as the "Hit with a Chair," the "Pile Driver" and "The Cobra Clutch."

The Bowlers Never Strike Out Award goes to Floyd Keirnan of Orange, Calif., for *CoCo Bowling Alley*, one of the top sports Simulations the judges have witnessed for any model of computer. The graphics effects include a lively ball, tumbling pins and an automatic scoreboard. There also are three levels of difficulty, none of which are easy.

The Let's Get Away From It All Award goes to Bill English of Greenfield, Ind., for *Vacation USA*, which charts an imaginary vacation for you, allowing you to budget expenses for sightseeing, entertainment, hotels, food and gas.

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The challenge is to see if you can stay within your means.

The Bull on Wall Street Award goes to Ray Ligocki of Milwaukee, Wis., for his version of *Stock Market*. While this is one of many such buying-and-selling-stocks Simulations we have seen, it includes some original high resolution graphics effects.

The Don't Tread on Me Award goes to Peter Brandt of Matthews, N.C., for *Truckin'*, a Simulation of the challenges of cross-country truck drivers, including the ever-present "county mounties," the hynoptic effects of those rolling white dividing lines and the shortage of gas stations in the Great Plains states.

The Casey Jones Award goes to E. L. Vasser of Frankfort, Ky., for his *Manual Block Train Dispatching Simulation*, which puts you in the train dispatcher's chair to control Seaboard System Railroad traffic between the Kentucky cities of Louisville, Lexington and Winchester. Included is an accurate schematic of the system actually used to trace rail movement.

A Penny Saved Is A Penny Earned Award goes to Audrey DeLisle of San Francisco, Calif., for *Refund*, which is a competitive Simulation to see who can save the most money. The players read coupon-saver bulletins listing offers, answer ads and make lists of values.

The Right Stuff Award goes to Aryeh Glaberson of Edison, N.J., for *Space Flight*, a situation involving the laws of celestial mechanics. A rocket taking off from earth must deal with the gravitational forces in order to make a safe landing on Mars within the maximum time allowed. This one is a real challenge.

The One-Two Punch Award goes to Dr. Robert Tyson for his *Olympic Boxing* entry. Dr.Tyson, one of the two grand prize winners in THE RAINBOW's first Simulation contest, has done thorough research in digging out the results of the actual competition last year in Los Angeles. Boxers are shown battling it out; you can watch or coach. Either way is fun.

The Golden Parachute Award goes to Duane S. Wood of Jacksonville, Fla., for *Pilot*, in which you attempt to survive a rigorous aerial obstacle course using only the arrow keys on your computer. Fast reflexes count almost as much as quick thinking in this one.

> ***"The Right Stuff Award goes to . . . a situation involving the laws of celestial mechanics."***

The 10-9-8-7-6-5-4-3-2-1-KABOOM! Award goes to Chris McKiernan of Chateauguay, Quebec, for *Bomb Squad*, which includes eight time bombs on three levels of play. You've got to figure out the secret codes before the unthinkable happens.

The Brain Child Award goes to Joel Robbins of Syracuse, Ind., for *Nereid Countdown*. It's one of those programs that requires a healthy respect for math and which you want to tackle when you have plenty of time on your hands. It also requires quick recall and finger dexterity to get the spaceship into orbit. It has a nice variety of graphics and sound effects.

And now for the judges' decision on the Grand Prize winner and the Graphics Best of Show!

Graphics Best of Show goes to Rene St. Jacques of Montreal, Quebec, for *Cardio*, a fascinating Simulation of a situation that could affect all of us — coronary thrombosis. Rene, who is studying for his master's degree in physiology at the University of Montreal, handles a serious subject with a great deal of care while managing to retain its entertaining aspects.

The Simulation is exceptional in every way, showing the blood moving through the various sections of the heart. You must act quickly if you are to save the patient. We know you will enjoy it, and you may even learn a few things in the process.

The 24-year-old St. Jacques says that as an integral part of his studies he examines rat brains to see how that important part of the body controls blood pressure in relation to hypertension. Maybe Rene will do a Simulation on that for our next contest.

Congratulations Rene!

Grand Prize in our second annual contest goes to Christopher Pfeifer of St. Paul, Minn., for *Surface*, a most impressive Simulation of the actual voyage of the USS Skate submarine, which in 1958 became the first to actually surface at the North Pole.

Pfeifer, a proofreader and editor for Rolin Graphics, says the idea for the Simulation came to him while visiting his father-in-law last summer. "I was reading a story in *Readers Digest* when it occurred to me that this would be a nice entry in the contest," he recalls.

Chris has been very faithful in following through on the actual mission, avoiding any temptation to add unnecessary elements while creating a tremendously challenging Simulation.

It will take you a while to surface, but we think you will enjoy every minute of *Surface*. It is a winner in every sense of the word.

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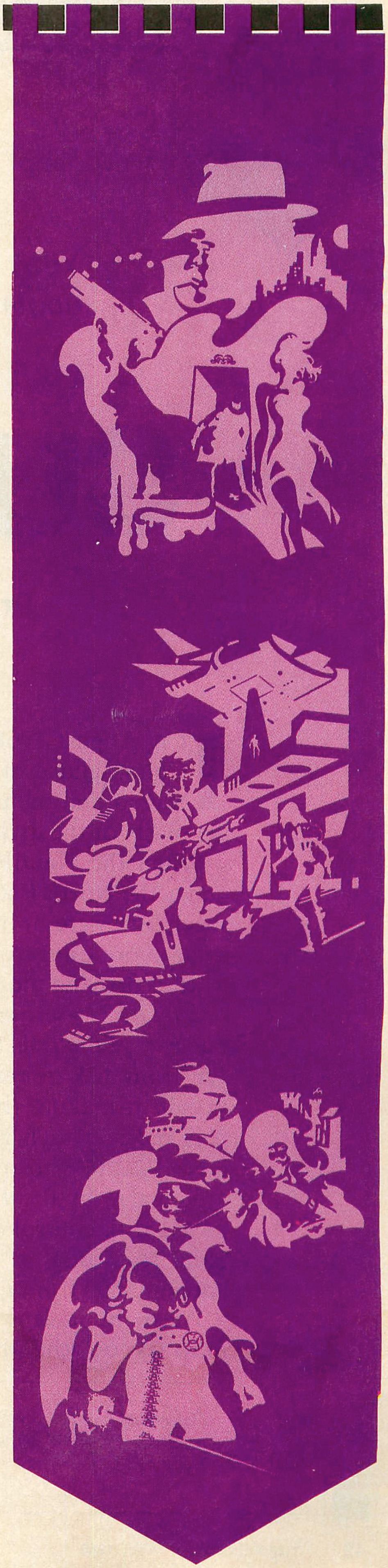
ANNOUNCING
THE THIRD ANNUAL RAINBOW ADVENTURE CONTEST



Calling all veteran and novice Adventurers. The RAINBOW Adventure Contest is back by popular demand! Here's your chance to shine.

Your Adventure can encompass any setting you can imagine. Write it in 4K, 16K, 32K or 64K, in BASIC or machine language, graphics or traditional text-only style. No specific categories. Send it in. We simply want your best!

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Originality counts plenty, as does proper attention to documentation. Include a complete solution to the Adventure, along with features and aspects that deserve the judges' attention. In writing the Adventure, don't pack so tightly that we can't `LIST` or `LLIST` an entire line. If the program includes machine language, fully-commented source code must be provided, as well as a working, assembled version of your program. After all, we do want to share your gem with our readers. Indicate the minimum system needed to run your program, i.e., 32K ECB. Your program should run on standard Radio Shack equipment with no special modifications required and should not rely on commercial software for its execution. Put the accompanying article, the documentation, complete loading instructions and cover letter on paper. Include your name, address and telephone number on each page of all materials.

It is mandatory that several saves of your Adventure be submitted on good-quality tape or disk; if it won't load, it will not be judged. We will not type in even the shortest of entries. Be sure to write-protect your disk or punch out the tabs on your tape to avoid accidental erasure and label each with the name of the program and your name and address. As in any contest, packaging does make a difference.

Above all, get your entry in by July 1, 1985 in bug-free condition. Each entrant will receive a free pass to the RAINBOWfest of his or her choice. You could win any of the prizes donated by these generous businesses.

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Wasatchware	MLBASIC Compiler.
YGS	Utility One, Utility One & OS9 BASIC, Utility One & Two, plus OS9 BASIC.

RULES: All programs must be original, unpublished and unmarketed works, no "conversions." Entries must be postmarked prior to July 1, 1985, and become the property of Falsoft, Inc., publisher of THE RAINBOW. Decision of the judges is final. Duplicate prizes will be awarded in the event of ties. Winning programs will be featured in a special RAINBOW Adventure issue. Address entries to "Adventure Contest Editor" and send to THE RAINBOW, 9529 U.S. Highway 42, P.O. Box 385, Prospect, KY 40059.

SIMULATION CONTEST WINNER

GRAND PRIZE WINNER

You're journeying to the North Pole in a submarine, but on this subaqueous voyage your mission is to

SURFACE!

Program By Christopher Pfeifer

It is August 1958. The USS Skate has left its moorings in New London, Conn., glided quietly down the moonlit Thames River, passed Long Island Sound and then heads north. As the continental shelf steadily drops away, the blasts of the diving alarm signal that it is time to go below.

When the Nautilus made headlines for being the first submarine to pass under the North Pole, the USS Skate and her crew of 97 men and nine civilian specialists were only four days behind. But Captain Calvert had been handed a far more dangerous mission — the Skate must try to surface at the Pole — thus proving the usefulness of the Arctic Ocean as an operational area.

Surface is a program designed to simulate the historic Arctic voyage of the nuclear submarine Skate as seen from its control room. It can be made to run from disk or cassette. When the program is run, an ML color test routine is called, making the screen either red or blue. Press the Reset button until it is red and then hit a key to start the voyage. The first thing *Surface* will do is `PCLEAR8` to make room for the two high resolution screen dumps that are created by the *DRAWINGS* program listed below (it checks to see if you have a disk controller plugged in — if so, the screen dumps will load at address $E00 from disk as `LOADM"CHARTS/ART"` — if not, then they will load at address $600 from cassette as `CLOADM"CHARTS"`).

After the screens are loaded, you will see a map of the Arctic Ocean. This map is on the navigation chart table and is continually updated

---

(Christopher Pfeifer has a degree in English and journalism, enjoys writing and designing, and works for a well-known graphics company. Chris is married, has two children and lives in St. Paul.)

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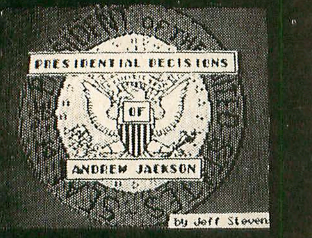

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Look between Greenland and Spitsbergen for a tiny flashing dot. That dot represents the Skate's current position, after its first attempt at surfacing in the ice pack. When the flashing dot enters the small circle at the center of the chart, the Skate will be at the North Pole: The only place on earth where every direction is south.

The numbers around the map represent compass headings in degrees. Starting from the center of the map, straight up equals zero, straight down equals 180, left equals 270, and right equals 90. You may find this useful when changing the ship's bearing.

The chart is the first of four screens that comprise the activities of the control room. You can alternate between three of these screens by pressing the space bar. The fourth screen is a work area and is not displayed unless the periscope is raised. The second screen is the ship's ice scanner (if you see a text screen instead, press the space bar again).

The original ice scanner was a remarkable device. It was a grey metal box with a glass window, behind which a sensitive stylus traced a profile of the ice above on a slowly rolling paper tape. A straight line meant no ice (or very thin ice) above. Your scanner represents open water as a single row of dots.

The tiny submarine on the scanner indicates the position and depth of the Skate in relation to the ice. The scale on the right-hand side of the screen shows depth in 10-fathom increments (a fathom is six feet, so 10 fathoms equals 60 feet).

Press the space bar and move on to the third screen — the text screen. Along the top are five boxes showing readings from the various instruments on board. Press the '0' key to see the menu. At the upper left-hand corner is the trim control. Below the word "TRIM" are the letters 'R' and 'P.' The number after the 'R' is the angle of the rudder, and it varies from -45 degrees (hard-a'port) to zero degrees (rudder-a'midships) to +45 degrees (hard-a'starboard). The number after the 'P' gives the angle of the diving planes ("30 degree down-bubble," etc.).

A submarine normally uses forward motion to control its depth, and the diving planes, acting like the elevators on an airplane, will pull the vessel up or push the vessel down depending on the angle at which they are set. If the submarine is not moving, however, the diving planes will have no effect on changing its depth.

The next box is labelled "BEARG," and the number given is the direction the ship's bow is pointing, in degrees. Thanks to the internal navigation set recently installed, you will not have to surface to get your bearings. You can change direction by pressing either '1' for right rudder, or '2' for left rudder. As with the diving planes, the ship must be moving for the rudder to be of any use.

The third box, "BLLST," tells you how full the ballast tanks are. The figure given is in percent of the total tank capacity. Therefore, a reading of zero percent means the ballast tanks are empty; 50 percent means the tanks are half full; 100 percent means the tanks are completely flooded. When the tanks are half full (50 percent) the submarine has neutral buoyancy (it won't rise or sink), but if the figure is less than 50 the submarine has negative buoyancy (it will rise toward the surface), and if the figure is greater than 50 the submarine has positive buoyancy (it will sink). The ship does not have to be moving for the ballast control to change its depth.

The fourth box isn't labelled, and gives three readings. The top figure is the depth of the submarine in fathoms. If it reads 'S,' then the ship is at the surface. A submarine measures its depth from the surface to its keel but, when travelling under the ice, it is more important to know the depth from the surface to its sail. The middle figure will explain why.

It is the reading from the ice scanner which tells you how deep the ice is, in fathoms, directly above the sail. Therefore, if the Skate's depth is 10 fathoms and the ice above is 10 fathoms, it means that the top of the submarine is touching the bottom of the ice.

The topside fathometer is a sonar device located on the sail, and it will beep whenever there is ice above it. The closer you are to the ice, the faster it will beep.

The bottom figure in the box is your latitude in hours and minutes, as given by the internal navigation set. Latitude is how far you are from the equator in degrees. If you sliced the world in half (in hemispheres) along the equator, the edge of that slice would be zero degrees latitude. Going from the center of the earth straight up to the Pole would be an angle of 90 degrees, the maximum latitude possible. Halfway from the equator to the Pole is 45 degrees. You will know when you are at the North Pole when your latitude reading is 90:00 (Ninety hours, zero minutes).

The last box, marked "SPEED," is fairly self-explanatory. It gives the Skate's velocity in knots. Full-speed ahead is 20 knots; half-speed is 10; all-stop is zero; full-a'stern (reverse) is 20 knots. Pressing '7' increases the speed and pressing '8' decreases it.

The menu below the boxes lists the commands which you will use to accomplish your mission. Pressing '9' raises the Skate's periscope. If the ship's depth is greater than 10 fathoms (60 feet), the periscope will not reach the surface and all you will see is water. Before raising the periscope, it is important to check the ice depth reading for ice above. If the ice depth reads zero, then the periscope is below open water and you may raise it safely.

When you are about to reach the Pole, slow down. As soon as you see "90:00" on the latitude indicator, come to a complete stop. Check the ice scanner for openings large enough to accommodate the submarine (five single dots or more in a row will give you enough open water).

If you see none, then before moving on again, turn the rudder over hard. The ship will now travel in a tight circle and soon return to (almost) the same spot. Upon your return, you will see that the ice cover over the Pole has changed because of drift. The crew of the Skate used a method of criss-crossing the Pole, waiting for drift to carry a decent-sized opening over the area, and it involved a lot of changes in direction. Some may prefer circling, but you may use whatever method you like. When you have succeeded at surfacing at exactly 90:00 (the depth indicator must read 'S' for "surfaced"), raise the periscope to send a message home.

Practice diving and surfacing while on your way to the Pole, so you won't make any mistakes when it counts. There is no SAVE feature to this Simulation — if you damage the Skate, your mission is scrubbed, and the Simulation is over.

You will also note that pressing the BREAK key doesn't stop the program. The program runs faster this way, and it would be a shame to accidentally touch the BREAK key and ruin your whole voyage.

There are several machine language routines in the program, such as the one that draws the ice on the ice scanner, and we must caution you to SAVE the progam first before running it or you may lose it completely!

It took the original Skate 13 days to journey from New London to the North Pole. This Simulation begins as the Skate encounters the ice pack. Traveling at 20 knots, at a safe depth of 60 fathoms, you should reach the Pole in 30 minutes. But bear this in mind: Getting to the Pole is easy — your orders are to SURFACE!

— Charles Springer

9	126	37	185
14	249	59	79
19	209	66	158
24	218	77	147
28	22	END	118
33	240		

Listing 1:

```
0 'CHARTS FOR U.S.S. SKATE BY
   CHRISTOPHER PFEIFER
   1348 N. DALE ST.
   ST. PAUL, MN  55117
1 GOTO3
2 GOTO5
3 PCLEAR8:GOTO2
4 GOTO2
5 IFPEEK(&HC000)=68 THEND=&H800
6 A=&H600+D:Z=A:CLS:PRINT:PRINT:
PRINT:PRINT"THIS PROGRAM WILL DR
AW THE TWO  HI-RES SCREENS NEEDE
D FOR THE   'SURFACE!' SIMULATIO
N. IT WILL  SAVE THE SCREENS AS
";:IFD=0THENPRINT"'CHARTS' ON YO
UR CASSETTE"ELSEPRINT"'CHARTS/AR
T'ON YOUR DISK"
7 FORR=1TO5000:NEXT:PMODE4,1:PCL
S:SCREEN1,1
8 B$="AA00A2XX0382A200AA00A888A8
XX028000AA008A888A808A00AAXXA700
AA00XX0222A2XX022200AA00A282A2XX
028200AA008A888A888A00AAXX34002A
022A202AXX1C002A022A202AXX4D00AA
00A222A282220AA008808880888000AA
00":GOSUB41
9 B$="XX02888AXX028000AAXX100002
XX030002XX1F002A222A222AXX1C00XX
02202A222AXX1C000200XX0302XX2C00
AA002A202A022A00AA00A282A2XX0282
00AAXX0200XX04800080XX1000A222A2
22A2XX1F002AXX03222AXX1C002AXX03
222AXX1C00":GOSUB41
10 B$="A222A200A0XX2C00AA002AXX0
40800AA008A088A0A8800AAXX1800A2X
X0322A2XX1300XX050102XX020700050
9081FXX021E0200XX0A15XX0955XX0A1
51005XX0315XX0605XX0601XX0F00022
2A2XX0222XX2C00AA002AXX03222A00A
A00":GOSUB41
11 B$="XX03800080000080XX1800A0XX0
320A000XX02010001XX0405XX0415545
1574F4E4D495145XX035515E07F3874F
484XX03551540555 2XX025150XX0451X
X0255XX054555XX0851XX02554015XX0
255XX0454XX1055XX0415XX040501A02
1XX0220A0":GOSUB41
12 B$="XX18000200XX0302XX0F00AA0
02A222AXX022000AAXX0600A808280 8A
8XX1000XX0301050415XX0214XX02545
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7XX02EFECDDDEDFBFBE60XX026515XX1
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9F8XX03FFXX03FEXX03FDFEXX28FFFEF
9F7E7977BFDFEXX17FFXX037FXX02BFX
X03DFEFEEF6F5XX03F1F0F1C524E4C41
454XX0555":GOSUB41
```

One-Liner Contest Winner . . .

Have you ever seen one of those erupting volcano models — the ones school children make in science classes? This display doesn't make such a mess.

The listing:

```
0 PMODE3,1:PCLS:SCREEN1,0:DRAW"B
M128,60;C4G100E100R15F100L215":P
AINT(128,70),4,4:G=135:H=60:FORH
=60TO1STEP-1:N=RND(20):I=RND(4):
CIRCLE(G,H),N,I,.10,.11,.1:NEXT:
FORK=1TO300:M=RND(255):T=RND(70)
:O=RND(4):PSET(M,T,O):NEXT:SOUND
50,5:FORB=1TO1000:NEXT:RUN
```

Sterling D. Miller
Charleston, WV

(For this winning one-liner contest entry, the author has been sent copies of both *The Rainbow Book Of Simulations* and its companion *Rainbow Simulations Tape.*)

```
27 B$="5040XX0400A222A202A2XX030
0A07CXX027FXX04FF994255154591FCX
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5XX0B55XX021555XX0245555051551 1E
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7EFCFDF":GOSUB41
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F002A222A222AXX1C00XX0522XX1C002
AXX03222AXX79002AXX03222AXX1C00A
2XX0322A2XXBB00A0XX0320A0":GOSUB
41
39 GOTO54
40 'poke routine number one
41 FORR=1TOLEN(B$)STEP2
42 A$=MID$(B$,R,2)
43 IF A$<>"XX" THEND$="01":C$="&
H"+A$:GOTO48
44 R=R+2
45 D$="&H"+MID$(B$,R,2)
46 R=R+2
47 C$="&H"+MID$(B$,R,2)
48 FORF=1 TO VAL(D$)
49 POKE A,VAL(C$)
50 A=A+32:IF A>&H1DFF+D THENZ=Z+
1:A=Z
51 NEXTF
52 NEXTR
53 RETURN
54 'submarine
55 PMODE4,5:PCLS:SCREEN1,1
56 A=&H1C9C+D
57 F=0:Y=4:Z=&H1C
58 B$="03E0000003200000003A00006F
F3E800FFFFEC00F8003C006FFFF":GOS
UB83
59 'v-scale
60 A=&H1F20+D
61 Y=3:Z=&H1D
62 B$="FFFFFFFFFFFFFFFFFFFFFFFFF
FFFFFFFEFCFFFCFB7FFEFB7FFEFB7FFC
7CFFFFFFFFFFFFFFFFFFF000000FFFFF
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000FFFFFFFFFFFFFFFFFFFFCFCFFFB7B
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63 B$="FFB7B7FFCFCFFFFFFFFFFFFFFFFF
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```
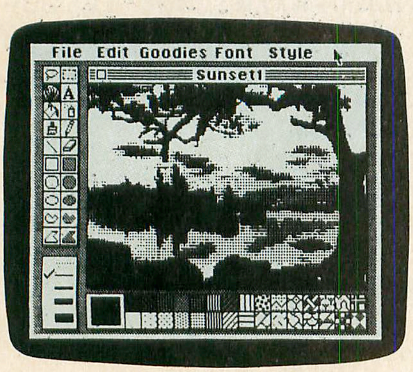
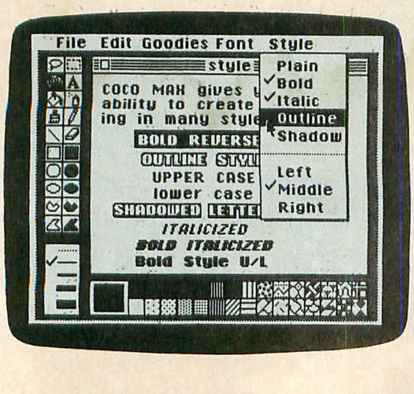

CoCo Max

This is one of those rare programs that will captivate everyone in your family.... No one can see CoCo Max and not want to try it!

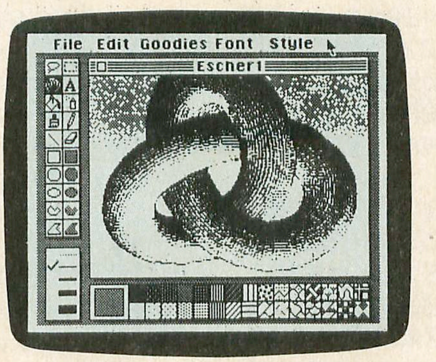

File Edit Goodies Font Style
Sunset1

We are all witnessing an exciting revolution in microcomputers: a radically new kind of computer and software that opens a whole new world of creative power to computer users.

It was inevitable that this exciting approach would be brought to the CoCo. With this in mind, Colorware chose to go all out and maximize this new concept for the color computer. That meant designing not just software but hardware too. It meant thousands of hours of pure machine language programming. Rarely has this much effort been applied to one product for the Color Computer.

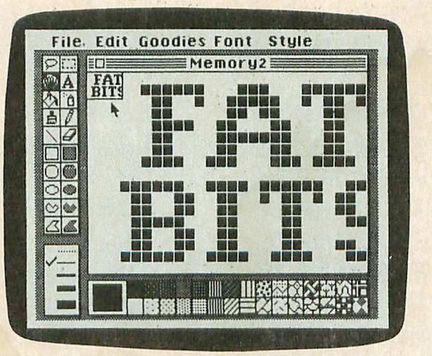

File Edit Goodies Font Style
style
Plain
✓Bold
✓Italic
Outline
Shadow
Left
✓Middle
Right

COCO MAX gives y
ability to create
ing in many style
BOLD REVERSE
OUTLINE STYL
UPPER CASE
lower case
SHADOWED LETTE
ITALICIZED
BOLD ITALICIZED
Bold Style U/L


File Edit Goodies Font Style
Escher1

UNMATCHED CAPABILITY...

Because we took the maximum approach: highly optimized machine code combined with hardware, CoCo Max truly stands above the rest as the ultimate creative tool for the Color Computer. It's unrivaled performance lets you create with more brilliance and more speed than any similar system – much more than you ever imagined possible. And, you can do it in black & white or color.

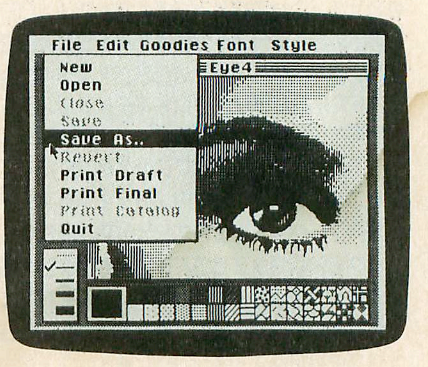

File Edit Goodies Font Style
Memory2
FAT BITS
FAT
BITS

All the sophisticated power of the bigger systems is there: *Icons, Pull-Down Menus,* full *Graphic Editing, Font Styles,* and all kinds of handy tools and shortcuts.

Plug your joystick, mouse or touch pad into CoCo Max's Hi-Res Input Unit. Then use a delightfully simple *Point-and-Click* method to get any of CoCo Max's powerful graphic tools. It has them all:

You can *Brush, Spray* or *Fill* with any *Color, Shading* or *Pattern.* Use *Rubber Band Lines* and *Shapes* (square, rectangle, circle, ellipse, etc.) to create perfect illustrations with speed and ease. There's a *Pencil,* an *Eraser* and even a selection of *Caligraphy Brushes.* And, as you can see, CoCo Max can do a lot with text.

All of the newest special effects are there: *Trace Edges, Flip, Invert, Brush Mirrors,* etc. And all of the very latest super-capabilities like: *Undo,* which automatically reverses your mistakes, and *Fat Bits* which zooms you way in on any part of your subject to allow dot-for-dot precision.


File Edit Goodies Font Style
New
Open
Close
Save
Save As..
Revert
Print Draft
Print Final
Print Catalog
Quit
Eye4

THE BIG PICTURE

The large image box in the middle of the CoCo Max screen is actually only a window on an even larger image. Use the Point-and Click "Hand" to effortlessly move your window over any portion of the larger image. You have a working area of up to 3-½ times the area of the window itself.

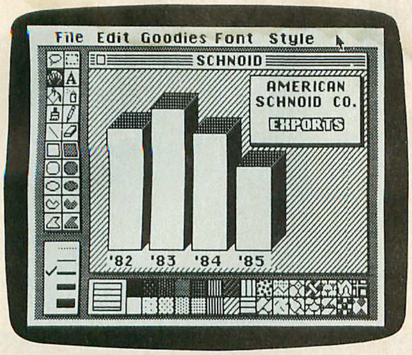
FLEXIBLE PRINTING...

CoCo Max gives you many ways to print. Fill a whole page with your image or condense two full CoCo screens to less than ¼ page for a finely detailed copy. "Dump" your CoCo Max screen full size or shrink it to ⅛ page size.

THE COCO MAX SYSTEM

FREEDOM TO CREATE...

Anyone who wants to create anything at all on their CoCo screen or printer will certainly be very glad to meet CoCo Max. CoCo Max's friendly yet sophisticated graphic and text capabilities let you almost instantly produce illustrations, diagrams, charts, graphs, and computer art – for serious use or just for creative fun.

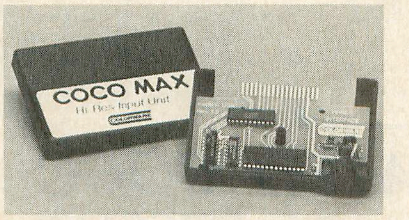


AN ABSOLUTE GUARANTEE

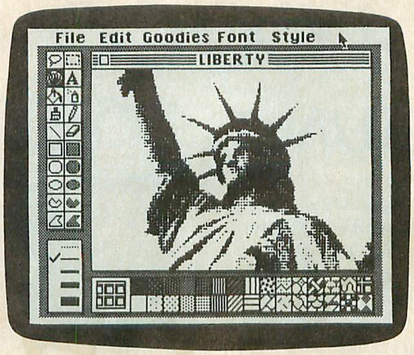
CoCo Max is a hardware/software system that no software-only system can match. Get CoCo Max and see your CoCo perform as it never could before. If you don't agree that CoCo Max is the ultimate creative tool for the Color Computer, simply return it within 20 days for a full, courteous refund from Colorware.

THE HARDWARE...

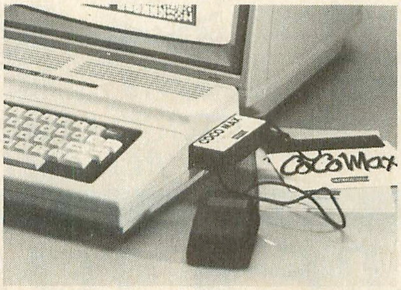
This is the key to CoCo Max's unmatched performance. Did you know the normal joystick input built into the Color Computer only allows access to 4,096 (64 x 64) points on the CoCo screen? Yet, the Color Computer's high resolution screen has 49,152 (256 x 192) pixels. This means that a joystick, mouse or even a touch pad can, at best, only access about one tenth of the pixels on the CoCo screen.



Most graphic programs ignore this hardware limitation of the Color Computer and give you only low-res control. Others attempt to overcome the limitation by using software schemes such as sliding windows. Although clever, these schemes yield sluggish and awkward results. Only CoCo Max does it the right way. The CoCo Max Hi-Res Input Unit plugs into your ROM slot and adds an entirely new joystick input to your computer – a precision one with a 49,152 point resolution to match the CoCo screen exactly.

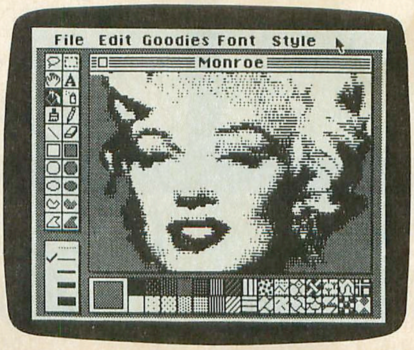


Plug your same joystick, mouse or touch pad into this new input and you have a whole new kind of control. The difference is remarkable.

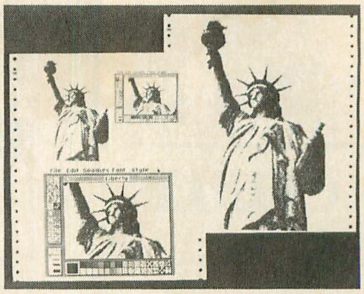


A DIGITIZER OPTION...

We studied all the video digitizers available and picked the best of them to link with CoCo Max. The DS-69 from Micro Works was our choice. This optional device lets you capture the image from any video source (video recorder, camera, etc.) on your Color Computer.



You may then use CoCo Max's graphic magic on it. The DS-69 is available as an option from Colorware from $149.95 complete with its own software on disk or tape. Using the DS-69 with a disk requires an RS multi-pak adaptor.



COCO MAX REQUIREMENTS

The CoCo Max System includes the Hi-Res Input Unit, software on disk or cassette (please specify) and user manual. It will work on any 64K Extended or non-extended Color Computer. You'll need a Radio Shack or equivalent joystick, mouse or touch pad. Disk systems require a Multi-Slot Interface or Y-Branching Cable.

THE COMPLETE COCO MAX SYSTEM, with software on *DISK*........... ***$69.95***

with software on *CASSETTE* (Available Mar '85)......................... ***$69.95***

Y-BRANCHING CABLE-If you have a disk system but do not have a Multi-Slot Interface, use this economical 40-pin, 1 male, 2 female cable to connect the CoCo Max Hi-Res input unit and your disk controller to your CoCo..... ***$27.95***

COLORWARE

TOLL FREE ORDER LINE:
(800) 221-0916

Colorware Inc.
78-03F Jamaica Ave.
Woodhaven, NY 11421
(718) 647-2864

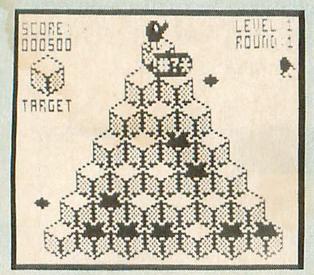
VISA

MasterCard

ORDERING INFORMATION

ADD $3.00 PER ORDER FOR SHIPPING AND HANDLING.
C.O.D.'S ADD $3.00 EXTRA.
SHIPPING AND HANDLING FOR CANADA IS $5.00
WE ACCEPT VISA, MASTER CARD, M.O.'S, CHECKS.
N.Y. RESIDENTS MUST ADD SALES TAX.

THE TOP 4 COCO GAMES...

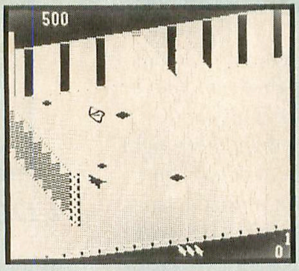


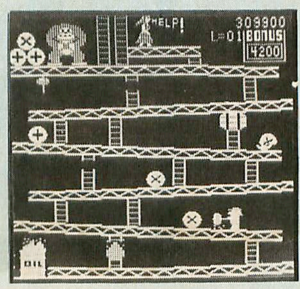
CUBIX

By Spectral Associates. Very much like the arcade smash! Jump little Cubix around the 3D maze trying to change the color of all the squares. With Death Globes, Discs, Snakes, etc. 32K Tape: $24.95

ZAKSUND

From Elite Software comes this fantastic arcade style space action game with 3 different stages of moving 3-D graphics. You've never seen anything like this on your CoCo! Great sound too! 32K Tape: $24.95



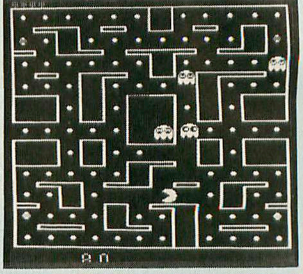


THE KING

Previously called 'Donkey King', you simply cannot buy a more impressive game for your CoCo. With 4 different screens and loads of fun! From Tom Mix Software. 32K Tape: $25.95

GHOST GOBBLER

From Spectral Assoc. This "PAC" theme game has been improved several times. It is definitely the best of its type. Brilliant color, action and sound, just like an arcade. 16K Tape: $24.95



COLORCADE

SUPER JOYSTICK MODULE

WITH RAPID FIRE!

ONLY $19.95

JOYSTICK INTERFACE/RAPID FIRE/6 FT. EXTENDER ALL IN ONE! The Colorcade allows connection of any Atari type joystick to your CoCo (including the Wico Red Ball). These switch type sticks are extremely rugged and have a faster and more positive response. They will improve the play of almost any action game.

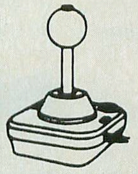
An adjustable speed rapid fire circuit is built in. Press your fire button and get a great burst of fire instead of just a single shot! You get a real advantage in shooting games that do not have repeat fire.

ATARI JOYSTICK

ONLY $8.50

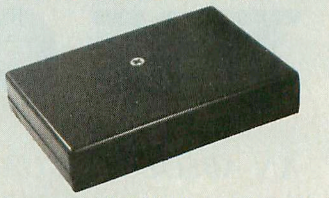
THE BEST YOU CAN BUY
WICO #15-9730

~~$34.95~~
$29.95



WICO FAMOUS "RED BALL"

ROM/ PROJECT/ PRODUCT CASE



Give a professional look to your project or product! High quality 3 piece injection molded plastic with spring loaded door. Designed especially for the CoCo ROM slot.

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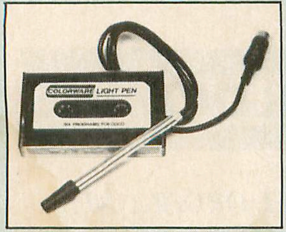
P.C. board for 27XX EPROMS . . . $4.00 Ea.

COLORWARE LIGHT PEN



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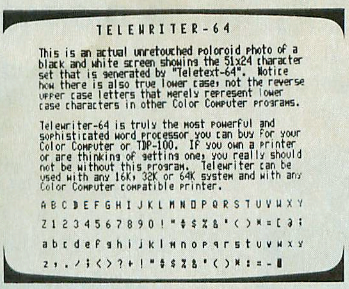
WITH SIX FREE PROGRAMS ON CASSETTE!

The Colorware Light Pen plugs directly into your joystick port and comes with six fun & useful programs on cassette. Easy instructions show how to use it with Basic and it's compatible with light pen software such as Computer Island's "Fun Pack." Order yours today. Only $24.95 complete.

TELEWRITER-64



```
TELEWRITER-64

This is an actual unretouched poloroid photo of a
black and white screen showing the 51x24 character
set that is generated by "Teletext-64".  Notice
how there is also true lower case, not the reverse
upper case letters that merely represent lower
case characters in other Color Computer programs.

Telewriter-64 is truly the most powerful and
sophisticated word processor you can buy for your
Color Computer or TDP-100.  If you own a printer
or are thinking of getting one, you really should
not be without this program.  Telewriter can be
used with any 16K, 32K or 64K system and with any
Color Computer compatible printer.

A B C D E F G H I J K L M N O P Q R S T U V W X Y
Z 1 2 3 4 5 6 7 8 9 0 ! " # $ % & ' ( ) * = [ @ ;
a b c d e f g h i j k l m n o p q r s t u v w x y
z , . / ; < > ? + ! " # $ % & ' ( ) * : = - █
```

DISK $59.95
CASSETTE . . . $49.95

Colorware researched the word processors available for the Color Computer. This is the best. Telewriter-64 is a truly sophisticated system that is marvelously easy to use. It works with any 16K, 32K or 64K system and any CoCo compatible printer.

TOP-RATED COCO WORD PROCESSOR

COLORWARE

VISA MasterCard

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ORDERS ONLY. N.Y. & INFO CALL (718) 647-2864

Why do more CoCo owners choose 'REAL TALKER'?

Sure it's priced right, but there's more...

Thousands of 'Real Talker' owners know 'Real Talker' beats ALL other Coco voice synthesizers in ease of use and flexibility. And, NO other Coco talker has a clearer, more intelligible voice. That's quite a lot of advantage when you consider Real Talker's unbeatable price. Yet, Real Talker has some important features that you simply will not find in other Coco talkers:

'Real Talker' is compatible with any 16K, 32K, 64K Extended or non-extended Color Computer. It works with any cassette or disk system and comes complete and ready to talk through your T.V. or monitor speaker. Price includes the 'Real Talker' electronic voice synthesizer in a ROM pack, software on cassette (may be transferred to disk), and user manual.

'SAY' command - You'll have your computer talking brilliantly in just minutes thanks to this powerful new command. Type SAY "ANYTHING YOU WANT" and your words are instantly spoken. It's that simple. Think how easy this makes creating speaking Basic programs. Adding speech to your existing programs is a snap too.

'CONVERT' - This is a truly powerful command for the basic programer. CONVERT automatically transforms a machine language dependent speaking program into a stand-alone Basic program. In other words, you can effortlessly write speaking Basic programs that do not require a machine language translator in memory. This is a unique feature of 'Real Talker'. No other voice synthesizer gives you anything even remotely approaching this type of capability - even synthesizers costing considerably more.

COLORWARE
'REAL TALKER'
INSTRUCTION
'REAL TALK
HARDWARE VOI
SYNTHESIZER
COLORWARE

'Real Talker' is a full-featured electronic voice synthesizer unit built into a compact cartridge case. You simply plug it into the side of your computer.

NOW INCLUDED WITH 'REAL TALKER'........

1. *'DR. TALK*-This interactive "Eliza" type psychoanalyst program will discuss your innermost problems at length.

2. *'TALKING BATTLESHIP'*-It's you vs. the computer in this speaking version of the classic game.

3. *'TALKING BLACKJACK'*- Play for big stakes against a rather talkative casino dealer.

ONLY

$59^{95}

Other features include software controlled pitch, unlimited vocabulary text-to-speech, and even a program that will recite any ASCII file (such as from Telewriter-64 & other word processors). You also get Colorware's unique full-screen phoneme editor program that let's you experiment with and modify speech at it's most fundimental level.

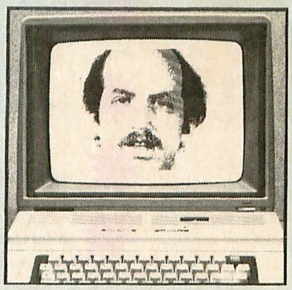
'REAL TALKER-1' (for the original Color Computer)...............*$59.95*

'REAL TALKER-2' (for the Color Computer-2)..........................*$64.95*

'Y - BRANCHING CABLE' For disk systems. If you have a disk system but do not have a Radio Shack Multi-Slot unit, this economical cable will allow to connect and use your Real Talker and Disk system together...................................*27.95*

TALKHEAD

If you have a 'Real Talker', do not deprive yourself of this absolutely incredible machine-language Talking Head simulation program. While other talking head simulations use a minimal cartoon-like face, TALKHEAD uses high resolution, full-screen, digitized images of an actual person's face to create a life-like animated effect.



ACTUAL UNRETOUCHED PHOTO

SOFTWARE FOR THE 'REAL TALKER'

TALKHEAD can be easily commanded in Basic to appear on screen and say anything you want. Available on cassette or disk for only $19.95, TALKHEAD requires 64K and a Colorware 'Real Talker'.

ONLY $19.95

COLORWARE

COLORWARE INC.
78-03F Jamaica Ave.
Woodhaven, NY 11421
(718) 647-2864

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SHIPPING & HANDLING FOR CANADA IS $4.00
WE ACCEPT VISA, MASTER CARD, M.O.'S, CHECKS.
N.Y. RESIDENTS MUST ADD SALES TAX.

```
7CFFFD7B7FF87B7FFF7B7FFF7CFFFFFF
FFFFFFFFFFFFF000000FFFFFFFFFFFF
FFFFFFF87CFFF9FB7FFEFB7FFB7B7FFC
FCFFFFFFFFFFFFFFFFFFF000000FFFFF
FFFFFFF":GOSUB 83
64 B$="FFFFFFFFCFCFFFBFB7FF8FB7F
FB7B7FFCFCFFFFFFFFFFFFFFFFFFF000
000FFFFFFFFFFFFFFFFFFFF87CFFFF7B
7FFF7B7FFEFB7FFDFCFFFFFFFFFFFFFF
FFFFF000000FFFFFFFFFFFFFFFFFFFFC
FCFFFB7B7FFCFB7FFB7B7FFCFCFFFFFF
FFFFFFF":GOSUB 83
65 B$="FFFFFF000000FFFFFFFFFFFFF
FFFFFFFCFCFFFB7B7FFD7B7FFF7B7FFC
FCFFFFFFFFFFFFFFFFFFF000000FFFFF
FFFFFFFFFFFFFEFCFCFCFB7B7EFB7B7E
FB7B7C7CFCFFFFFFFFFFFFFFFFFFF000
000FFFFFFFFFFFFFFFFFFEFEFCFCFCFB
7EFEFB7":GOSUB 83
66 B$="EFEFB7C7C7CFFFFFFFFFFFFFF
FFFFF000000FFFFFFFFFFFFFFFFFFEFC
FCFCFB7B7EFEFB7EFDFB7C787CFFFFFF
FFFFFFFFFFFFF000000FFFFFFFFFFFFF
FFFFFEFCFCFCFB7B7EFEFB7EFB7B7C7C
FCFFFFFFFFFFFFFFFFFFF000000FFFFF
FFFFFFF":GOSUB 83
67 B$="FFFFFFEFE7CFCFD7B7EF87B7E
FF7B7C7F7CFFFFFFFFFFFFFFFFFFFFFF
FFF":GOSUB83
68 'h-scale
69 A=&H1E00+D
70 Y=0:Z=0
71 B$="FFFFFFEFFFFFEFFFFFEFFFFFE
FFFFFEFFFFFEFFFFFEFFFFFEFFFFFFFF
FFFFFFFFFCFCFEFEFCFEFCFCFEFEFCFE
FCFCFEFCFCFEFE7CFEF87CFEFCFCFFFC
7CFCFB7FFB7B7EFCFB7EFB7B7EFCFB7E
FB7B7EFB7B7EFD7B7EF9FB7EFBFB7FFB
FB7B797FFEF":GOSUB83
72 B$="B7EFEFB7EFB7B7EFEFB7EFEFB
7EFEFB7EF87B7EFEFB7EF8FB7FFCFBF8
7A7FFDFB7EFEFB7EFB7B7EFEFB7EFDFB
7EFB7B7EFF7B7EFB7B7EFB7B7FFF7B7B
7B7FF87CFEFC7CFEFCFCFEFC7CFEF87C
FEFCFCFEFF7CFEFCFCFEFCFCFFF8FCFB
7B7FFFFFFEF":GOSUB83
73 B$="FFFFEFFFFFEFFFFFEFFFFFEFF
FFFEFFFFFEFFFFFEFFFFFFFFFFFFFFFF
FFFFEFFFFFEFFFFFEFFFFFEFFFFFEFF
FFFEFFFFFEFFFFFEFFFFFFFFFFFFFFF"
:GOSUB83
74 'uss nameplate
75 A=&H3480+D
76 Y=0:Z=0
77 B$="FFFFFFFFFFFFFFFFFFFFFFFFF
FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF
```

MEET

COLORBURST

- At the Chicago RAINBOWfest May 17 to 19.
- COLORBURST . . . the Memory Expansion System.
- Extra memory: 64K, 128K, 256K, 512K, or ONE MEGABYTE. (4 bank — 64K to 256K chips)
- 6 Software Selectable Expansion Ports.
- Multi-RAM bank driver.
- Disk Controller Cartridge connector.
- OS/9 and RS DOS compatable.
- Increased throughput.
- Plugs directly into CoCo Cartridge Port.

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```
FFFFFFF555555555555555555555555
5555555555555555555555555555555
5555555555555555555555555555555
5555555555555555555555555555555
55555555555":GOSUB83
78 B$="5577557D557D55557D775D7F7
F5555557F7D7F557D7D5D77777F7D555
55555555577557755775555777777D5D7
55555555D7775557777777D77777567555
555557D5577557555755555757D675D7
5557D555D757555757567 7F7F7567557
D55557D5577":GOSUB83
79 B$="557D557D55557D7D675D7D557
D555D757D557D75677F7F7D7D557D555
555557755575555755555577D7F5D75555
5555D757555577 57F7777757D5555555
55555777577757777555777777 5D75555
5555D77755577777777777757775555555
555557D757D":GOSUB83
80 B$="757D75557D77775D7F5555557
F7D7F557D7D7777777F7755555555555
5555555555555555555555555555555
5555555555555555555555555555555
5555555555555555555555555555555
555555555555555555555555555500":G
OSUB83
81 CLS:SOUND50,4:IFD=&H800 THEN8
2ELSEPRINT@200,"READY CASSETTE";
:INPUTM:CSAVEM"CHARTS",&H600,&H3
5FF,0:END
82 PRINT@200,"READY DISK";:INPUT
M:SAVEM"CHARTS/ART",&HE00,&H3DFF
,0:END
83 'poke routine number two
84 FORR=1TOLEN(B$)STEP2
85 F=F+1:IF F=Y THEN A=A+Z:F=0
86 A$="&H"+MID$(B$,R,2)
87 POKEA,VAL(A$):A=A+1:NEXTR
88 RETURN
```

16 57		123 138	
39 38		130 89	
57 191		152 45	
75 245		161 185	
100 255		END 89	

Listing 2:

```
0 'SURFACE!' * 1984
  BY CHRISTOPHER PFEIFER
  1348 N. DALE ST.
  ST. PAUL, MN 55117
1 '********************************
2 'NOTE 1: SAVE THIS PROGRAM
  BEFORE RUNNING IT!
  NOTE 2: THE CASSETTE VERSION
  SHOULD HAVE "CHARTS" (MADE BY
  THE "DRAWINGS" PROGRAM) AFTER
  THIS ONE ON TAPE
3 '********************************
4 CLEAR200,&H6000
5 IFPEEK(&HC000)=&H44 THENDK=&H8
00
6 IFPEEK(&H72)=&H60 THEN12
7 GOSUB164
8 GOSUB183
9 EXEC&H6070
10 GOTO14
11 'pclear
12 PCLEAR8:GOTO10
13 GOTO10
14 IFPEEK(&HC000)=&H44 THENDK=&H
800
15 IFPEEK(&H145E+DK)=&HA0 THEN17
16 IFDK=&H800 THENLOADM"CHARTS/A
RT" ELSE CLOADM"CHARTS"
17 'get sub
18 DIMQQ(5)
19 PMODE4,1:GET(220,179)-(242,18
7),QQ,G
20 POKE&H6097,&H12:POKE&H73,&H97
 'revise reset
21 POKE&H167,&H39 'disable texts
creen after print
22 GOSUB173 'draw ice routine
23 GOSUB159 'break disable
24 DR=220:D=13:IT=4:SR=50:GB=RND
(300)+400
25 PX=138:PY=40.9:K=30 'start lo
cation
26 GOSUB151
27 FORR=&H6000 TO &H6038:POKER,R
ND(IT)+D-1:NEXT:FORR=&H6020 TO &
H6030:POKER,D:NEXT
28 PMODE4,5
29 EXEC&H60E0 'erase ice
30 KL=(DP*1.155)+17
31 IF KL=>179 THEN KL=179
32 IFDP<147THENPUT(52,(DP*1.155)
+9)-(74,KL),QQ,PSET 'put sub
33 EXEC&H6040:IFSP=0ORPS>0THENPS
=PS-1:GOTO54ELSEPS=5-(ABS(SP)/4)
34 H=RND(IT)-1
35 PX=PX+((FX/100)*SP)/500
36 PY=PY+((FY/100)*SP)/500
37 IFPX<128THENKX=(PX/3)+9ELSEKX
=((256-PX)/3)+9
38 IFPY<96THENKY=((PY*2)/3)-9ELS
EKY=(((192-PY)*2)/3)-9
39 K=((KX+KY)/2)-3.3:IFK<0THENK=
0ELSEIFK>50THENK=50
40 ZZ=PEEK(&H603F)
41 IFGG=1THEN44
42 IF ZZ<>&H38 THEND=PEEK(ZZ+&H6
001) ELSED=PEEK(&H6000)
43 GOTO45
44 IF ZZ<1 THEND=PEEK(ZZ+&H5FFF)
ELSED=PEEK(&H6038)
45 IFRND(110)>K THEN47
46 IFD<170THEND=D+H:GOTO48
```

```
47 D=D-H
48 IF D<13 THEN D=13
49 IFGG=0THENPOKE(ZZ+&H6000),D E
LSE POKE(ZZ+&H5FFF),D
50 IFGG=1THEN53
51 IFZZ=0THENPOKE&H603F,&H38 ELS
E POKE&H603F,ZZ-1
52 GOTO54
53 IF ZZ=&H38 THENPOKE&H603F,0 E
LSE POKE&H603F,ZZ+1
54 PMODE3,1:LD=PPOINT(PX,PY):DD=
PPOINT(PX+1,PY):DL=PPOINT(PX-1,P
Y):PSET(PX,PY,1):IFLD=6ANDDL=6AN
DDD=6THENPSET(PX,PY,LD):GB=4:GOT
O133 ELSE GOSUB178:PSET(PX,PY,LD
)
55 PMODE4,5:EXEC&H60B0
56 IFDP>5THENIFPPOINT(64,KL-8)=5
THENGB=3:GOTO133
57 IFDP>2THENIFPPOINT(56,KL-5)=5
ORPPOINT(60,KL-5)=5ORPPOINT(68,K
L-5)=5ORPPOINT(72,KL-5)=5THENGB=
3:GOTO133
58 'get key
59 A$=INKEY$:IFA$=" "THEN86ELSEI
FA$="0"THENGOSUB155
60 IFA$=""THEN62ELSESOUND1,1
61 ON VAL(A$) GOSUB93,95,97,99,1
01,103,105,108,111
62 DR=DR+((L*SP)/100): 'change d
irection
63 GOSUB76
64 GOSUB80
65 IFDR<0THENDR=DR+360ELSEIFDR>3
60THENDR=DR-360:PRINT@72,"    ";
66 DP=DP+(TR/10)+((SP*RS)/300)
67 IF DP>GB THENGB=1:GOTO133 'cr
ash
68 IFDP<0THENDP=0
69 'print outs
70 F$=STR$((K+40)*100):F=VAL(MID
$(F$,4,2)):F=INT(F*.6)
71 TE=PEEK(&H603F)+40: IF TE=>&H3
9 THEN TE=TE-&H39
72 IC=INT((PEEK(&H6000+TE))/1.16
-11)
73 C$=STR$(F/100)+"00":IFDP=0THE
NPRINT@51," S";ELSEPRINT@51,INT(
DP-4);
74 PRINT@66,L;:PRINT@71,INT(DR);
:PRINT@77,SR;:PRINT@83,IC;:PRINT
@92,SP;:PRINT@98,RS;:PRINT@115,L
EFT$(F$,3);":";MID$(C$,3,2);:GOS
UB178
75 GOTO28
76 IFDR<90THENFX=DR:FY=DR-90:RET
URN
77 IFDR<180THENFX=180-DR:FY=DR-9
0:RETURN
```

```
78 IFDR>270THENFX=DR-360:FY=270-
DR:RETURN
79 FX=180-DR:FY=270-DR:RETURN
80 TR=SR-50:RETURN
81 'poke routine
82 FORR=1TOLEN(B$)STEP2
83 C$="&H"+MID$(B$,R,2)
84 V=VAL(C$):POKEY,V:Y=Y+1:NEXTR
85 RETURN
86 SOUND1,1:CS=CS+1:IFCS>3THENCS
=1
87 ONCS GOSUB89,90,91
88 GOTO28
89 PMODE4,1:SCREEN1,1:RETURN
90 SCREEN0:RETURN
91 SCREEN1,1:EXEC&H60D0
92 RETURN
93 IFL<45THENL=L+5
94 RETURN
95 IFL>-45THENL=L-5
96 RETURN
97 IFRS<45THENRS=RS+5
98 RETURN
99 IFRS>-45THENRS=RS-5
100 RETURN
101 IFSR>0THENSR=SR-2
102 RETURN
103 IFSR<100THENSR=SR+2
104 RETURN
105 IFSP<20THENSP=SP+4
106 IFSP<0THENGG=1ELSEGG=0
107 RETURN
108 IFSP>-20THENSP=SP-4
109 IFSP<0THENGG=1ELSEGG=0
110 RETURN
111 'periscope
112 PRINT@160,"":FORR=1TO9:PRINT
:NEXT:PRINT@197,"PERISCOPE AYE,
CAPTAIN"
113 IFIC=0THEN114ELSEIFDP-IC<14T
HENGB=2:GOTO133
114 FORR=1TO5:SOUNDR*10,1:NEXT:P
MODE3,5:PCLS3:FORR=80TO94STEP2:C
IRCLE(128,96),R:NEXT
115 GOSUB131
116 IFDP>15THENPAINT(128,96),2,0
:GOSUB131:CIRCLE(128,96),80,1:CI
RCLE(128,96),95,1:GOTO124
117 CI=0:FORR=&H6000 TO &H6038:C
I=CI+PEEK(R):NEXT:CI=CI/57-13:LI
NE(50,96)-(220,96),PSET:PAINT(12
8,90),0,0:PAINT(128,100),2,0
118 GOSUB131
119 DW=96:FORR=60TO210STEP10:WD=
RND(CI*10):WD=97-WD
120 IFWD>130THENWD=130ELSEIFWD<0
THENWD=RND(90)
121 LINE(R-10,DW)-(R,WD),PRESET:
DW=WD:NEXT
```

```
122 GOSUB131
123 CIRCLE(128,96),95,1:CIRCLE(1
28,96),80,1:PAINT(128,20),1,1:PR
INT@160,"":FORR=1TO9:PRINT:NEXT:
PRINT@203,"WE ARE ";:PRINTUSING"
###.#";(50-K)*25:PRINT"      NAUTI
CAL MILES FROM POLE"
124 PMODE4,5:SCREEN1,1
125 A$=INKEY$:IFA$=""THEN125 ELS
E POKE&H60B0,&H10:POKE&H60B4,&H1
2:POKE&H60BC,&H12
127 SCREEN0:EXEC&H60B0
128 POKE&H60B0,&H12:POKE&H60B4,&
H10:POKE&H60BC,&H10
129 IF DP=0 AND MID$(F$,2,1)="9"
 THENGOTO142
130 FORR=1TO5000:NEXT:PRINT@160,
"":FORR=1TO9:PRINT:NEXT:RETURN
131 PRINT"              UP . . .":R
ETURN
132 'goodbye
133 CLS:SCREEN0:SOUND30,30
134 PRINT@200,"MISSION SCRUBBED"
135 ON GB GOSUB137,138,139,140
136 A$=INKEY$:IFA$=""THEN136ELSE
RUN
137 PRINT"      EXESSIVE PRESSUR
E HAS":PRINT"            DAMAGED H
ULL":RETURN
138 PRINT"    PERISCOPE DAMAGED
BY ICE":RETURN
139 PRINT"       COLLISION WITH
ICE":PRINT"   REQUIRES EXTENSIVE
 REPAIRS":RETURN
140 PRINT"         SUB HAS RUN AGR
OUND":RETURN
141 'messages
142 PRINT@160,"":FORR=1TO9:PRINT
:NEXT
143 PRINT@160,"":B$=" ANY SHIP O
R ANY STATION X THIS  IS THE USS
 SKATE X WE HAVE A    MESSAGE TO
 SEND X OVER":GOSUB148:GOSUB147
144 PRINT:PRINT:B$=" THIS IS RAD
IO MANILA X HEAR      YOU LOUD AN
D CLEAR X WILL        RELAY YOUR
MESSAGE X OVER":GOSUB148:GOSUB14
7
145 PRINT@160,"":FORR=1TO8:PRINT
:NEXT:PRINT@160,"":B$=" FROM USS
 SKATE TO NAVY            DEPARTME
NT X HAVE SURFACED AT   NORTH GE
OGRAPHIC POLE X OVER":GOSUB148:G
OSUB147
146 PRINT:PRINT:B$=" TO USS SKAT
E FROM CHIEF OF       NAVAL OPERA
```

SUPPORT:

(sə·pôrt) v.t. **1**. To bear the weight of, especially from underneath; uphold in position; keep from failing, etc. **2**. To bear or sustain (weight; etc.) **3**. To keep from failing; strengthen: *PBJ, Inc. supports their product line with technical personnel that are always there to help you.* **4**.To serve, to uphold or corroborate (a statement, theory, etc.) substantiate; verify: *PBJ, Inc. receives testimonials on a daily basis that support their product line.* **5.** To provide (a person, institution) with maintenance; provide for: *PBJ, Inc. supports the CoCo user by consistently creating new advancements in their field.*

Synonym: **PBJ, Inc.**

A long description indeed, yet very applicable to the kind of service delivered by PBJ, Inc. When the serious CoCo user needs back-up support, technical information or assistance, PBJ, Inc. is there! From the products they manufacture through to the strategic solutions they offer, PBJ, Inc. has rightfully gained the reputation of "the company with *the most support* for the Color Computer."

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"Innovative Products for the CoCo User"

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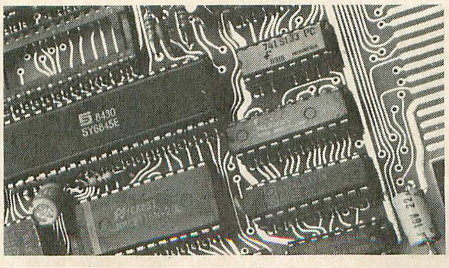
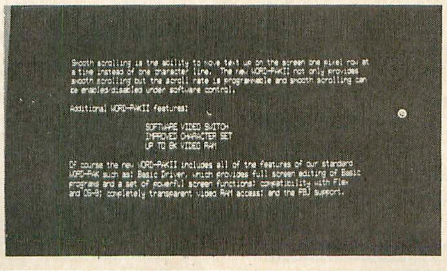
*Derived from *Funk & Wagnall's International Dictionary*



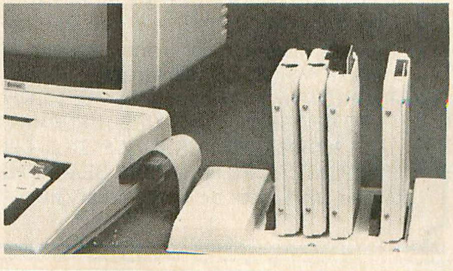


```
Smooth scrolling is the ability to move text up on the screen one pixel row at
a time instead of one character line.  The new WORD-PAKII not only provides
smooth scrolling but the scroll rate is programmable and smooth scrolling can
be enabled/disabled under software control.

Additional WORD-PAKII features:

          SOFTWARE VIDEO SWITCH
          IMPROVED CHARACTER SET
          UP TO 8K VIDEO RAM

Of course the new WORD-PAKII includes all of the features of our standard
WORD-PAK such as: Basic Driver, which provides full screen editing of Basic
programs and a set of powerful screen functions: compatibility with Flex
and OS-9; completely transparent video RAM access: and the PBJ support.
```



```
TIONS X                  CONGRATULAT
IONS ON A JOB WELL   DONE X OVER
 AND OUT":GOSUB148
147 A$=INKEY$:IFA$=""THEN147ELSE
RETURN
148 FORR=1TOLEN(B$)STEP2
149 C$=MID$(B$,R,2):SOUND255,1:P
RINTC$;:NEXT:RETURN
150 'draw control panel
151 A=175:CLS0::FORR=0TO31:PRINT
CHR$(A);:NEXT:PRINT" TRIM ";CHR$
(A);"BEARG";CHR$(A);"BLLST";CHR$
(A);"        ";CHR$(A);"SPEEDR:
  ";CHR$(A);"       ";CHR$(A);"
  ";CHR$(A);"       ";
152 PRINTCHR$(A);"      P:    ";C
HR$(A);"DEGRS";CHR$(A);"% CAP";C
HR$(A);"        ";CHR$(A);"KNOTS"
;:FORR=1TO32:PRINTCHR$(A);:NEXT
153 FORR=1TO10:PRINT:NEXT
154 GOTO157
155 PRINT@160,"  <SPC> = CHANGE
SCREEN":PRINT"    <1> = RIGHT RU
DDER (+)":PRINT"    <2> = LEFT R
UDDER (-)":PRINT"    <3> = DIVIN
G PLANE DOWN (+)":PRINT"    <4>
= DIVING PLANE UP (-)"
156 PRINT"    <5> = BLOW MAIN BA
LLAST":PRINT"    <6> = FILL MAIN
 BALLAST":PRINT"    <7> = INCREA
SE SPEED (+)":PRINT"    <8> = DE
CREASE SPEED (-)":PRINT"    <9>
= PERISCOPE (UP/DOWN)"
157 FORR=1TO31:PRINTCHR$(A);:NEX
T:POKE&H5FF,&HAF
158 RETURN
159 'break disable
160 B$="32621CAF7EADA5":Y=&HF8:G
OSUB82
161 POKE&H19A,&H39:POKE&H19B,0:P
OKE&H19C,&HF8:POKE&H19A,&H7E
162 RETURN
163 'color test
164 B$="121A5086F8B7FF22B7FFC3B7
FFC5B7FFC7B7FFC9":IFDK=0 THEN165
 ELSEB$=B$+"B7FFCB"
165 B$=B$+"8E0"+HEX$(&H600+DK)
166 B$=B$+"CCAAAAED818C"
167 B$=B$+HEX$(&H1E00+DK)
168 B$=B$+"25F9BDADFB128EAB83108
EAA96CE02E010CE7F331A847EAE7512"
169 Y=&H6070:GOSUB82
170 POKE&H71,&H55:POKE&H72,&H60:
POKE&H73,&H70
171 RETURN
172 'draw ice
173 Y=&H603E
174 B$="600086FF97B586E0BE603EC6
0DD7C6E680D7C097BE97C4800427138C
603822093412BD94A1351220E68E6000
20F239"
175 GOSUB82
176 RETURN
177 'sonar
178 IFTIMER>E THENTIMER=0 ELSE R
ETURN
179 E=(DP-4-IC)*5:IFE<-20THENGB=
3:GOTO133
180 IF IC=0 THENRETURNELSESOUND1
50,1
181 RETURN
182 'screen routines
183 B$="128E6200108E"
184 B$=B$+HEX$(&H1E00+DK)
185 B$=B$+"ECA1ED81108C"
186 B$=B$+HEX$(&H3600+DK)
187 B$=B$+"25F686FFC60E8E0152A78
05A270820F98662447E960F39"
188 Y=&H60B0:GOSUB82
189 'erase ice
190 B$="125F8E"
191 B$=B$+HEX$(&H1F00+DK)
192 B$=B$+"861DE7804A27068C"
193 B$=B$+HEX$(&H347C+DK)
194 B$=B$+"25F639300320EF12"
195 Y=&H60E0:GOSUB82
196 RETURN
```

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The automated computer calendar

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Code: A0

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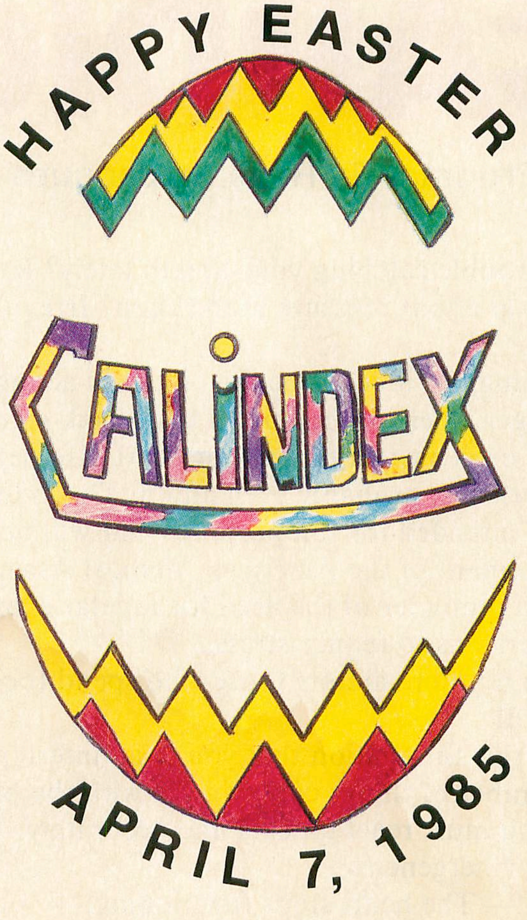
YEAR: 1985

"Dear Aunt Carla"

It's easy to remember Mom n' Pop and your other half on important dates. But what about all the other relatives and aquaintences you would like to remember but forget all too often.

Come to think of it, aren't there a multitude of things you would like to remember but don't? A lot of things you'd like to do but forgot about? Well, use Calindex and get more out of life!



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Getting To The Heart Of The Matter

CARDIO

Program By Rene St. Jacques

Had some trouble catching your breath lately? Recurring shoulder pains? What about pressure in the chest? Irregular pulse? Fluttering sensations?

It could be nothing. Or it could be the ol' ticker acting up on you. Don't feel like the Lone Ranger when you're flat on your back staring up into a sea of concerned faces. Coronary thrombosis (or heart disease) is the leading cause of death among Americans, probably even among CoCo lovers.

While *Cardio* is intended for fun purposes and will never receive the unanimous endorsement of the American Medical Association (what would?), it should serve as a reminder of the need for regular exercise, attention to your diet and some diversions to reduce stress.

That means you if you're among those who spend too many hours at the computer keyboard!

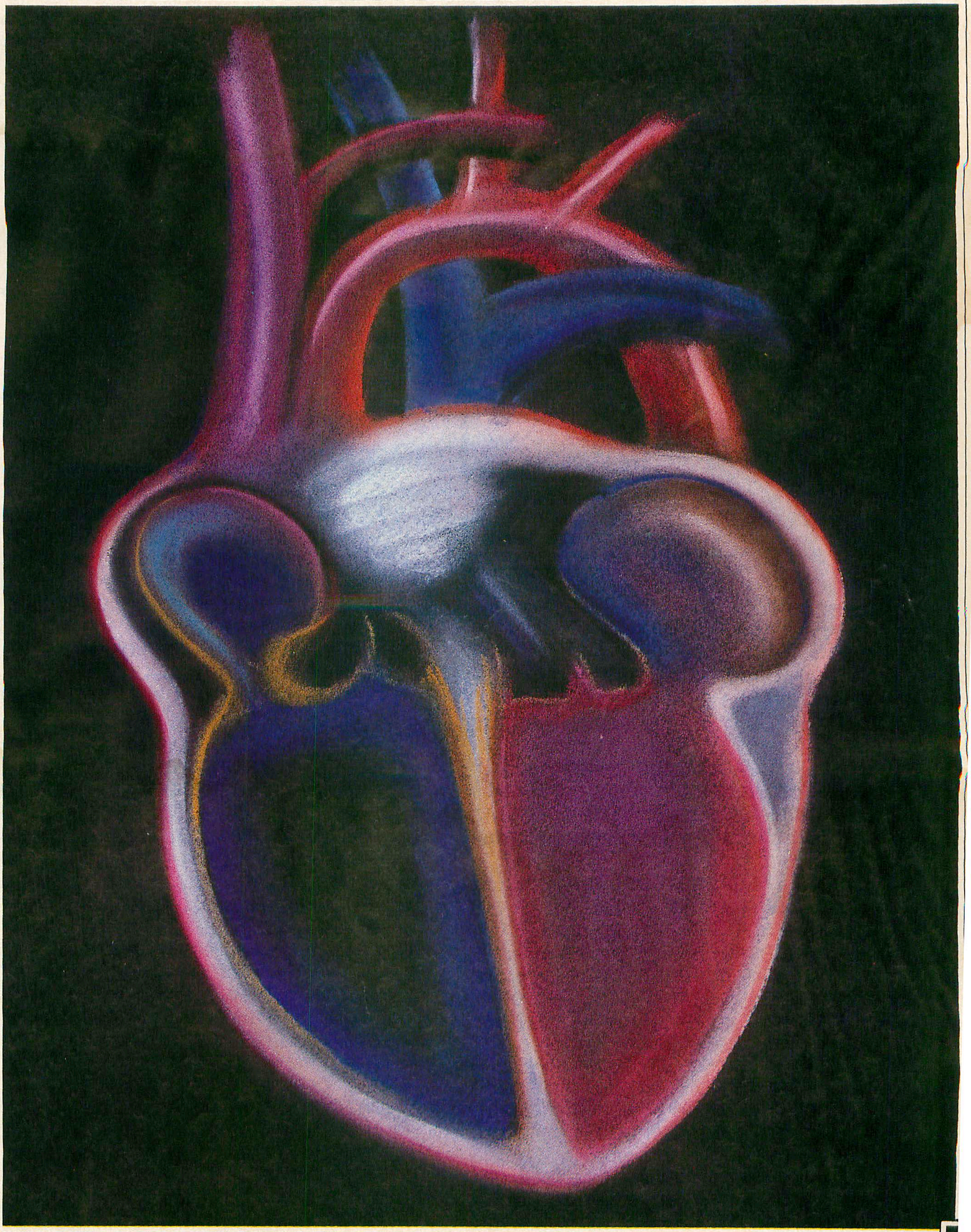
Imagine during this Simulation that you're an intern studying to be a heart specialist. Any number of things can go awry with the human heart, and to save the patient you must react quickly and accurately. You will be confronted with the following emergencies:

* Heart Attack — The heart stops functioning.
* Ischemia — A lack of blood to the heart.
* A-V Block — A malfunctioning of the ventricles.
* Lack of Energy or Oxygen — A shortage of air intake.
* Valve Failure — A failure of one of the organs pumping blood.
* Leukemia — An oversupply of white blood cells.

As the Simulation begins, you observe what appears to be a normally functioning heart. Likely, you'll find it's fascinating to watch the movement of

---

(Rene St. Jacques is a 24-year-old student studying for his master's degree in physiology at the University of Montreal in Quebec.)



blood through the various sections of the heart as it is cleansed before being returned to other parts of the body.

Blood entering the right side of the heart contains carbon dioxide, a waste product of the body. All blood entering the right side goes to the lungs before it reaches the left side of the heart. In the lungs, the carbon dioxide is removed and oxygen is added to the blood. Blood that flows to the body from the left side of the heart contains fresh oxygen. The oxygen is used in the body cells to produce energy.

There are many examples of how the heart changes its rate of beating to meet a particular need. It beats faster when a person is angry, afraid or excited. If a person does not exercise, the heart runs slower, regulating the blood to fit the body's tempo.

As you are pondering all of these things, something suddenly goes wrong. You are expected to act immediately, determine the problem and prescribe course of action.

You have eight available options, which you implement by pressing one of the following keys:

B	— Artificial respiration
D	— Dextrose (sugar)
E	— Excitative drug
M	— Heart massage
O	— Operation
R	— Relaxant drug
S	— Electroshock
T	— Blood transfusion

Like many graphics programs written in BASIC, it is sometimes difficult to enter commands via the keyboard, so you may have to issue your "order" two or three times.

We really don't want to lose any patients; here are some pointers:

For heart attack, massage first and apply electroshock. For ischemia, try a relaxant and artificial breathing or an operation. For A-V Block, use an excitant (stimulant) drug and apply electroshock if necessary. For lack of energy, prescribe dextrose. For lack of oxygen, use artificial respiration. For valve failure, you'll have to operate. For leukemia, try a transfusion.

Good luck, Dr. CoCo. And take care of yourself.

— Charles Springer

100	164	910	41
200	33	1060	205
260	78	1200	47
340	187	1370	62
500	251	6020	67
620	15	7000	65
730	33	END	122

The listing:

```
10 CLEAR1000
20 PCLEAR8
30 PMODE3,1:PCLS:SCREEN1,0
40 DIM L$(33)
50 L$(0)="BR4U2BU3U2BD7BR8":L$(1
)="BU4R8BD4BR4":L$(4)="U8R2D8R2U
BR2D8R2U8R2D8":L$(5)="BU5U3R8D3G
3L2D1BD2D1BR9":L$(6)="BR12
60 L$(7)="U8R8D4L8BR8D4BR4":L$(8
)="U8R6F2D2L8BR8D2G2L6BR12":L$(9
)="U8R8BD8L8BR12":L$(10)="U8R6F2
D4G2L6BR12":L$(11)="U8R8BD4L8BD4
R8BR4"
70 L$(12)="U8R8BD4L8BD4BR12":L$(
13)="U8R8BD4L4BR4D4L8BR12":L$(14
)="U8BR8D8BU4L8BD4BR12":L$(15)="
BU8R8BL4D8BL4R8BR4"
80 L$(16)="U4BU4BR8D8L8BR12":L$(
17)="U8BR8G4L4BR4F4BR4":L$(18)="
U8BD8R8BR4":L$(19)="U8F4E4D8BR4"
:L$(20)="U8F8U8BD8BR4"
90 L$(21)="U8R8D8L8BR12":L$(22)=
"U8R8D4L8BD4BR12":L$(23)="U8R8D8
H4BG4R8BR4":L$(24)="U8R8D4L8BR4F
4BR4":L$(25)="BU4U4R8BD4L8BR8D4L
8BR12"
100 L$(26)="BU8R8BL4D8BR8":L$(27
)="U8BR8D8L8BR12":L$(28)="BU8D4F
4E4U4BD8BR4":L$(29)="U8BR8D8H4G4
BR12":L$(30)="E8BL8F8BR4"
110 L$(31)="BU8F4E4BG4D4BR8":L$(
32)="BU8R8G8R8BR4"
120 ECG$="R3U1E1U1E1R1F1D1F1D1R3
D2F1R1E1U4E1U2E1U2E1U2E1U2E1F1D2
F1D2F1D2F1D2F1D4F1R1E1U2R6U1E1U1
E1U1E1R2F1D1F1D1F1D1R6"
130 COLOR3,1:LINE(0,0)-(255,0),P
SET:LINE(0,0)-(0,191),PSET:LINE(
255,0)-(255,191),PSET:LINE(0,191
)-(255,191),PSET:COLOR2,1
140 A$="CARDIO":OP$="S14;BM8,40"
:GOSUB5000:A$="BY:@RENE@ST":OP$=
"S4;BM15,180":GOSUB5000:A$=";JAC
QUES":OP$="BM+0,0":GOSUB5000
150 DRAW"S10;C4;BM115,120;"+ECG$
:OP$="S3;C2;BM127,103":A$="P@@@@
@@T":GOSUB5000:OP$="BM140,140":A
$="Q@@S":GOSUB5000:OP$="BM152,80
":A$="R":GOSUB5000
160 CIRCLE(40,86),15,4,1,.5,0:CI
RCLE(65,86),15,4,1,.5,0:CIRCLE(5
4,64),30,4,2.3,.33,.45:CIRCLE(51
,64),30,4,2.3,.05,.2:CIRCLE(53,8
0),22,4,2.5,.18,.38
170 IFINKEY$=""THEN170
180 CLS:SCREEN0,0:PRINT@136,"DO
YOU WANT THE":PRINT@200,"INSTRUC
TIONS":PRINT@264,"(Y/N) ?"
190 B$=INKEY$:IFB$=""THEN190ELSE
IFB$="Y"THEN200ELSE350
200 CLS:N$="      THIS IS AN EDU
CATIONAL SIMULATION OF THE HEART
 FUNCTION AND OF SEVEN EMERGENCY
 SITUATIONS THAT CAN AFFECT IT."
:GOSUB8000
210 N$="      WHEN THE HEART IS
FUNCTIONING, AN EMERGENCY SITUAT
ION WILL APPEAR. THEN YOU HAVE A
```

```
 LIMITED TIME TO REACT AND GIVE
THE CORRECT TREATMENT.":GOSUB800
0
220 N$="       NOTE THAT WHEN YOU
 HAVE TO INKEY$ AND THE HEART IS
 FUNCTIONNING YOU MAY HAVE TO IN
KEY$ MORE THAN ONCE.":GOSUB8000:
PRINT:PRINT"PRESS ANY KEY TO CON
TINUE"
230 IF INKEY$=""THEN230
240 CLS:N$="       YOU HAVE TO TA
KE NOTE OF THE TREATMENTS BECAUS
E THEY WONT APPEAR DURING THE CO
URSE OF THE SIMULATION.":GOSUB80
00:PRINT:PRINT"(B) ARTIFICIAL BR
EATHING":PRINT"(D) DEXTROSE (SUG
AR)":PRINT"(E) EXITATIVE DRUG":P
RINT"(M) MASSAGE"
250 PRINT"(O) OPERATION":PRINT"(
R) RELAXATIVE DRUG":PRINT"(S) EL
ECTROSHOCK":PRINT"(T) TRANSFUSIO
N":PRINT:PRINT"PRESS ANY KEY TO
CONTINUE"
260 IFINKEY$=""THEN260ELSECLS:PR
INT:PRINT"THIS PROGRAM WAS WRITT
EN IN     SUMMER 1984 BY:":PRINT
:PRINT"RENE ST-JACQUES":PRINT"21
55 RUE ED.-MONTPETIT #47":PRINT"
MONTREAL, P.Q., CANADA":PRINT"(5
14) 739-2689     H3T 1J3":PRINT
270 PRINT:N$="       DO YOU WANT
A BRIEF DESCRIPTION OF THE EMERG
ENCY SITUATIONS (Y/N)?":GOSUB800
0
280 B$=INKEY$:IFB$=""THEN280ELSE
IFB$<>"Y"THEN350
290 CLS:PRINT"HEART ATTACK :":N$
="THAT'S WHEN THE HEART STOPS BE
ATING.":GOSUB8000:PRINT:PRINT"IS
CHEMIA :":N$="THAT'S A LACK OF B
LOOD CIRCULATION.":GOSUB8000
300 PRINT:PRINT"A-V BLOCK :":N$=
"THAT'S WHEN THE VENTRICLES ALON
E STOP BEATING.":GOSUB8000:PRINT
:PRINT:PRINT"PRESS ANY KEY TO CO
NTINUE"
310 IFINKEY$=""THEN310
320 CLS:PRINT"LACK OF ENERGY :":
PRINT"LACK OF OXYGEN :":PRINT"ME
ANING WHAT IT SAYS.":PRINT:PRINT
"VALVE FAILURE :":N$="THAT'S WHE
N ONE VALVE INSIDE THE HEART STO
PS FUNCTIONING PROPERLY.":GOSUB8
000
330 PRINT:PRINT"LEUKEMIA :":N$="
THAT'S A BLOOD CANCER RISING THE
 LEVEL OF WHITE BLOOD CELLS. NOR
MALLY IT'S AN INCURABLE DISEASE
BUT IN THIS SIMULATION LET'S SUP
POSE THAT THERE IS A SUFFICIENT
TREATMENT.":GOSUB8000
340 IFINKEY$=""THEN340
350 PCLS:SCREEN1,0:COLOR2,1
360 'VEINES CAVES
370 LINE(8,10)-(8,160),PSET:CIRC
LE(19,10),11,2,.4
380 LINE(30,10)-(30,49),PSET:LIN
E(30,122)-(30,160),PSET:CIRCLE(1
9,160),12,2,.4,0,.5
390 'OREILLETTES
400 CIRCLE(60,70),45,2,.7:CIRCLE
(130,70),45,2,.7,.6,.4
410 'VENTRICULES
420 CIRCLE(95,89),70,2,1.4,0,.51
430 'AORTE
440 CIRCLE(135,50),50,2,1.1,.52,
.68
450 CIRCLE(150,50),48,2,1.1,.52,
.66:CIRCLE(121,5),11,2,.4
460 'INTERSEPTUM
470 CIRCLE(112,135),30,2,2.4,.37
,.62:CIRCLE(75,106),7,2:CIRCLE(1
00,105),10,2:PAINT(75,106),2,2:P
AINT(100,105),2,2
480 'ARTERES PULMONAIRES
490 CIRCLE(30,48),50,2,.8,.79,.9
9:CIRCLE(35,43),55,2,.8,.9,.99:C
IRCLE(35,43),55,2,.8,.77,.87:CIR
CLE(110,50),50,2,1,.63,.68:CIRCL
E(110,50),58,2,1,.63,.66:CIRCLE(
36,6),5,2,1.4:CIRCLE(82,4),9,2,.
4
500 'VEINES PULMONAIRES
510 CIRCLE(105,50),50,2,.7,.86,.
97:CIRCLE(105,50),60,2,.7,.83,.9
5:CIRCLE(200,67),51,2,.7,.6,.72:
CIRCLE(200,67),60,2,.75,.64,.72:
CIRCLE(132,19),5,2:CIRCLE(190,29
),5,2
520 'VALVES
530 CIRCLE(28,69),9,2,1.5:CIRCLE
(150,55),9,2
540 CIRCLE(59,92),17,2,.3:CIRCLE
(130,92),17,2,.3:PAINT(49,92),2,
2:PAINT(120,92),2,2:PAINT(28,69)
,2,2:PAINT(150,55),2,2
550 LINE(168,100)-(255,125),PSET
,B
560 FORX=1TO4:PCOPY X TO X+4:NEX
T
570 'BATTEMENT DU COEUR
580 TIMER=0:CA=4
590 PAINT(12,162),3,2:PAINT(161,
47),CA,2:CIRCLE(28,69),9,1,1.5:P
AINT(28,69),3,1:CIRCLE(150,55),9
,1:PAINT(150,50),CA,1:CIRCLE(28,
69),9,2,1.5:CIRCLE(150,55),9,2:P
AINT(28,56),3,2:PAINT(158,50),CA
```

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```
,2
600 PAINT(12,162),1,2:PAINT(161,
47),1,2:PAINT(31,70),2,2:PAINT(1
50,50),2,2
610 CIRCLE(59,92),17,1,.3:CIRCLE
(130,92),17,1,.3:PAINT(59,92),3,
1:PAINT(130,92),CA,1:CIRCLE(59,9
2),17,2,.3:CIRCLE(130,92),17,2,.
3:PAINT(50,100),3,2:PAINT(88,115
),CA,2
620 PAINT(49,92),2,2:PAINT(120,9
2),2,2
630 PAINT(60,70),1,2:PAINT(139,7
0),1,2:PAINT(12,162),1,2:PAINT(1
61,47),1,2
640 IFCOCO ANDR=3THENRETURN
650 A=TIMER:V=RND(700)+1200:IFCO
CO THEN660ELSEIFA>V THENSOUND100
,4:SOUND150,2:R=RND(7):ONR GOTO7
50,890,1040,1150,1230,1300,1370
660 PAINT(75,106),3,3:PAINT(100,
106),CA,CA:CIRCLE(75,106),7,2:CI
RCLE(100,105),10,2
670 IFCOCO ANDR=6THENCIRCLE(100,
105),6,1
680 PAINT(78,30),3,2:PAINT(95,35
),CA,2
690 PAINT(50,100),1,2:PAINT(88,1
15),1,2:PAINT(75,106),2,2:PAINT(
100,106),2,2:PLAY"L8.;V10;O1;G-"
:PAINT(78,30),1,2:PAINT(108,35),
1,2
700 IFCOCO ANDR=6THENCIRCLE(100,
105),6,1
710 PAINT(78,30),1,2:PAINT(95,35
),1,2:IFCOCO AND(R=5ORR=6ORR=7)T
HENRETURN
720 FORH=8TO5STEP-1:PCOPYH TOH-4
:NEXT
730 IFCOCO ANDR=6THENCIRCLE(100,
105),6,1
740 GOTO590
750 'ARRET CARDIAQUE
760 OP$="S3C4BM180,111":A$="HEAR
T":GOSUB5000:OP$="BM180,121":A$=
"ATTACK":GOSUB5000
770 CIRCLE(210,63),30,2:CIRCLE(2
10,63),30,2,.6,.15,.35:CIRCLE(21
0,68),5,2,1.4:CIRCLE(200,58),7,2
:CIRCLE(222,58),7,2:PAINT(210,35
),3,2:OP$="S4C3BM120,187":A$="?"
:GOSUB5000
780 FORH=1TO60:B$=INKEY$:GOSUB60
00
790 IFB$="M"THENPAINT(210,33),1,
1:V=RND(2):ON V GOTO830,870
800 IFB$="S"THENGOSUB6080
810 IFB$<>""ANDB$<>"S"THENGOSUB6
110
```

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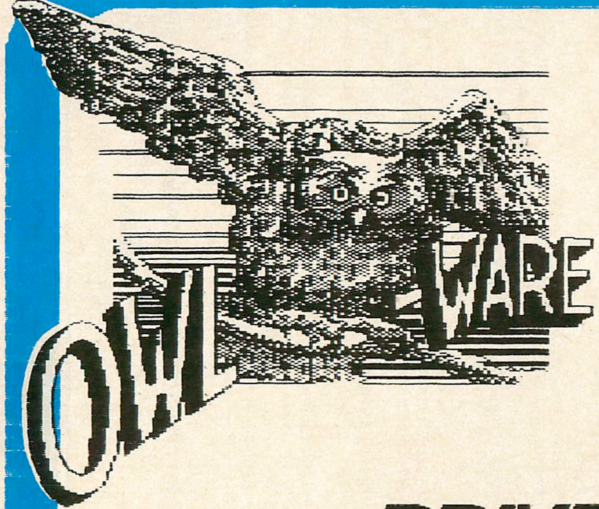

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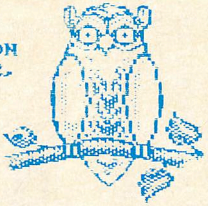

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2.4

by
Paul S. Hoffman

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3 PROGRAM DISCOUNT: 15%

```
820 NEXTH:GOTO7010
830 GOSUB6050
840 FORH=1TO20:B$=INKEY$:GOSUB60
00:IFB$="M"THEN830ELSEIFB$="S"TH
EN870
850 IFB$<>""THENGOSUB6110ELSE880
860 GOTO880
870 PAINT(180,105),1,2:PAINT(180
,120),1,2:TIMER=500:GOTO660
880 NEXTH:GOTO7010
890 'ISHKEMIE
900 OP$="S3C4BM175,117":A$="ISCH
EMIA":GOSUB5000
910 CIRCLE(200,47),15,4,1,.5,0:C
IRCLE(225,47),15,4,1,.5,0:CIRCLE
(214,25),30,4,2.3,.33,.45:CIRCLE
(210,25),30,4,2.3,.05,.2:CIRCLE(
211,41),22,4,2.5,.12,.38:PAINT(2
10,92),3,4:OP$="S4C3BM120,187":A
$="?":GOSUB5000
920 FORH=1TO60:B$=INKEY$:GOSUB60
00
930 IFB$="R"THENV=RND(2):PAINT(2
10,92),1,1:ONV GOTO1030,970
940 IFB$="O"THENGOSUB6080
950 IFB$<>""ANDB$<>"O"ANDB$<>"R"
THENGOSUB6110
960 NEXTH:GOTO7010
970 GOSUB6050
980 FORH=1TO20:B$=INKEY$:GOSUB60
00
990 IFB$="R"THEN970ELSEIFB$="B"T
HENV=RND(2):ONV GOTO1030,970
1000 IFB$="O"THEN1030
1010 IFB$<>""ANDB$<>"R"ANDB$<>"O
"ANDB$<>"B"THENGOSUB6110
1020 NEXTH:GOTO7010
1030 PAINT(175,117),1,2:TIMER=50
0:GOTO660
1040 'A-V BLOCK
1050 OP$="S3C4BM190,109":A$="A;V
":GOSUB5000:OP$="S4BM180,123":A$
="BLOCK":GOSUB5000:OP$="C3BM120,
187":A$="?":GOSUB5000:B$="":GOSU
B6000
1060 FORH=1TO4:COCO=1:GOSUB590:B
$=INKEY$:GOSUB6000
1070 IFB$=""THEN1080ELSEIFB$="E"
THENV=RND(2):ONV GOTO1090,1140:E
LSEIFB$="S"THENGOSUB6050ELSEIFB$
="O"THENGOSUB6080ELSEIFB$="R"THE
NGOOTO7000ELSEGOSUB6080
1080 NEXTH:GOTO7010
1090 GOSUB6050
1100 FORH=1TO4:COCO=1:GOSUB590:B
$=INKEY$:GOSUB6000
```

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THE SECOND GENERATION WORD PROCESSOR IS HERE! ELITE•WORD is a high performance, all machine language, Full Screen Editor which offers an ease-of-use that is simply incredible. ELITE•WORD has many powerful features not found in other word processors for the Color Computer. ELITE•WORD also offers a printed output flexibility that can handle your sophisticated home and business applications.

LOOK at these features:

Very easy to use • Top screen line reserved for HELP display/Command prompts • Excellent for BOTH program editing and word processing • TWO text entry modes; Insert or Exchange • Auto Key-Repeat • Smooth display scroll for easier proof reading • True Upper/Lower case display with lower case descenders • Hi-Res text "View" mode displays text exactly as it will be printed; including text Justification, Auto Line Centering, dynamic Margin changes, Top and Bottom Margins, Page Numbering, and Page Breaks • Include feature (disk only) permits including several file names within one output document; total document will have sequential page numbering if desired • Fast Disk I/O; no loading of overlay files to slow down operation • Variable Text (Mail Merge) capability for Form Letter generation included FREE!

32K Extended Basic Required for ROM routine calls • Variable TAB stops • User definable Headers and Footers • Smooth cursor movement over text; in any direction (including vertical) • Page Forward or Backward through text • Jump to beginning or end of text • Automatic text centering • Automatic text Word-Wrap if desired • True Block text Move, Delete, or Copy • Delete entire screen line • Backspace and Delete Character • Delete character above cursor • Find a string of characters • Global Replace character string • Two Hi-Res screen displays; 32 x 19 for text entry/editing, 64 x 19 for formatted text viewing • Continuous Memory display • Over 22K file size in 64K machines • Easy generation of ASCII files • Save/Load text files (in ASCII if desired) • Program remembers last File Name loaded or saved, and will write to it by default if desired • All I/O errors trapped and recoverable • Disk commands for Change Drive, Directory and Free Space • Print Format features allow user to specify Left Margin, Line Length, Line Spacing, Top and Bottom Margin, Duplicate Copies, Right-Side text Justification, Page Pause, Page Numbering, and more • Dynamically change any print Format features within text • Imbed Hex codes and printer Font changes within text.

Additional OS-9 version features:
Edit two files simultaneously • Save or Print only a portion of the text buffer • Edit files larger than memory (uses disk as buffer) • Block Copy from one file to another • Execute any OS-9 command from Editor

If you want powerful features AND a program that's EASY TO USE, Elite•Word is for you . . .

Elite·Word TAPE	RS#90-0183
Elite·Word DISK	RS#90-0184
Elite·Word/OS-9	RS#90-0186

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OS-9 Disk	$ 79.95
OS-9 & RS Disk	$115.95

"Elite•Word is a terrific word processor with an impressive list of features, yet it's easy to learn and use."
—Stuart Hawkinson, HOT COCO

"I was more than satisfied with Elite•Word . . . After the review, I would not hesitate to compare it with the two best selling word processors. And my comparison places it at the top of the list."
—A. Buddy Hogan, RAINBOW

★ COLOR COMPUTER DICTIONARY ★

Elite•Spel™

Elite•Spel is an excellent spelling checker for your Color Computer, and its VERY FAST . . . that's the key. Why wait while a spelling checker does its job? Elite•Spel identifies all potentially misspelled words with a single pass through its perfectly adequate 24,000 word dictionary. Elite•Spel lets you Add or Delete Dictionary words EASILY. Elite•Spel is fully compatible with Elite•Word and will work with ASCII files from other programs.

MAJOR features include:

Easy to use, menu commands • Can learn 4,000 of your own words • List suspect words on screen or printer • Alphabetical listing of all words used with number of occurrences • Learn entire files of words • Can also "edit spelling in context" if desired • Works in single or multiple drive systems • 32K Disk required.

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Speed is the key . . .
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Available on Disk only **$29.95**

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★ COLOR COMPUTER COMMUNICATIONS ★

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CHECK these program features:

Fully interrupt driven; you can talk to the host while it's talking to you and NOT drop a character • True Upper/Lower case screen display • Selectable text Word-Wrap • Review buffered text at ANY TIME • Selectable Smooth-Scroll in Review mode • Screen page Forward or Backward through buffered text • Save/Load buffer files • Transmit files to host computer • Print buffered text or saved files • 32K Required.

Elite•Comm is SMOOTH operation that's EASY TO USE!

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★ COLOR COMPUTER DATA BASE MANAGER ★

Elite•File™

THIS IS IT! ELITE•FILE is the Data Base Manager that Color Computer users have been waiting for. ELITE•FILE is for everyone who needs to store and retrieve information. ELITE•FILE is a full-featured relational Data Base Manager with all the editing and report formatting features that are typically found on much larger computer systems. COMPARE the others for record structure flexibility, total record capacity, information processing ability, speed of program response, printed output flexibility, and you'll agree that ELITE•FILE may very well be the most powerful/useful program ever written for the Color Computer.

No other File Manager gives you these features:
All machine language for speed • Flexible, user defined, data record structures • Up to 255 characters per record field • Up to 255 fields per record • Up to 2000 characters per record • Up to 4000 records per file • Up to 16 files can be open at the same time for information processing • Edit, Scan, Sort, Select Record information; all done FAST • Output reports to Screen, Printer, or ASCII Disk file • Place output data by Field Name, with Custom Text anywhere on the printed page • Perform math operations (+, −, *, /) between Field contents • Produce tabulated reports from multiple record contents • Generate column totals across record field contents.

Compatible with Elite•Calc and Elite•Word files • User friendly combination of Menu driven input, and single key commands • Supports up to 4 drives • Minimum 32K RAM, Disk required • Nested sub-field definitions • Up to 8 fields in Primary Key • Copy record definition from file to file • View/Print record definition • Input/Add records with easy to use field name format display • Edit records with full screen "type over" editor • Copy records to repeat identical data • Load Elite•Calc worksheets into random access data files • Scan mode for quick data retrieval • Locate any record by field contents • Select specific groups of records by field content with full logic combination capabilities • Sort records in ascending or descending order by any field, or group of fields • Calculate values from combinations of field contents • Output any subset of fields in any order for printed reports • User setable print formats; Page Title, Top and Bottom Margin, Line Spacing, Page Length, Page Pause, Form Feeds and more • Output format also supports TAB, VTAB, CR, PAGE, text, HEX printer controls, and more • Join up to four sub-files to extend data record for printing • Produce detailed repetitive reports, for output on preprinted forms, using output formats written on Elite•Word • Variable Text Insert feature of Elite•Word is fully supported • Refile old record data into NEW record structures • Data, Field Definitions, Indices all stored on a single file • Memory resident, no program overlays from disk • Single program performs all features • List disk Directories and "Kill" files without leaving the program • Data files also accessible from BASIC programs.

Radio Shack® catalog # 90-0189

COMPARE features and performance speed ... you'll agree that Elite•File is the one to buy.

THE BEST
FOR ONLY
$74.50
Disk Only

Elite Software

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Available
with
Calc-List

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Elite•Calc™

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MAJOR features include:
Very EASY to use • FAST Sorting • Printed Output, Screen Re-write, and Calculations all done FAST • Full cell-edit capability • Powerful cell-format options • Individual cell formulas • FREE sample worksheets • CALC-LIST availability.

Single character commands • Help displays • 255 maximum rows • 255 maximum columns • Available memory always displayed • Rapid Entry modes for text and data • Selectable, automatic, cursor movement • Insert, Delete, Move entire rows or columns • Replicate one cell to fill a row or column with selectable formula adjustment • All machine language for speed • Extended BASIC required for ROM routine calls • Automatic memory size detection for 16K, 32K, or 64K • >20K bytes storage available in 32K systems • Math operators: +, −, x, /, ↑, (,) • Relation operators: =, >, <, <=, >=, <> • Logic Operations: AND, OR, NOT • Conditional Formula: IF, THEN, ELSE • Trig Functions: SIN, COS, TAN, ATN • Log Functions: LOG, EXP, SQR • Misc. Functions: INT, FX, ABS, SGN, RND • Range Functions: SUM, AVERAGE, COUNT, MIN, MAX, LOOKUP • Definable constant table • User definable *printer set-up* commands • Individual column width settings • Adjustable row height to insert blank lines without wasting memory • Hide columns or rows • Alternate print font selectable on a cell by cell basis • Display/Print formats set by cell, row, or column • Dollar format, comma grouping, prefix or postfix sign • Scientific notation, fixed point and interger formats • Left and Right cell contents justification • Full page formatting • All formats stored with worksheet on disk (tape) • Save/Load Disk (tape) files in compact memory form • Scan disk directories • Output ASCII file for word processor input capability • Memory resident code ... no repeated disk calls.

CALC-LIST is a separate, machine language, utility that works independently of Elite•Calc. It can read either tape or disk worksheet files, and will give you additional information that was previously "hidden" within your worksheet. With CALC-LIST, you can list on the screen (or print) the actual contents of your worksheet cells, including FORMULAS. You get all the valuable worksheet format data including assigned Column Widths, all cell Format specifications ($, C, I, F#, G, etc.), Constant table assignments, and Printer Format information (Set-up, Page Length, Line Width, etc.). Use your CALC-LIST printout as a hardcopy backup of your worksheet for review or archival purposes. You can even let your friends use the listing so they can type your worksheets.

Elite·Calc TAPE
RS catalog #90-0187

Elite·Calc DISK
RS catalog #90-0188

Specify Tape or Disk

Elite•Calc	$69.95
Calc-List	$24.95
Elite•Calc and Calc-List	$79.95

> *"Elite•Calc is a great spreadsheet program! This professional quality program has the performance required for serious home applications as well as small businesses."*
> *—Stuart Hawkinson, RAINBOW*
>
> *"Truly one of the best programs I have seen."*
> *—John Steiner, MICRO*
>
> *"Elite•Calc is an extremely powerful worksheet ..."*
> *—Jack Lane, COLOR MICRO JOURNAL*
>
> *"Bruce Cook's Elite•Calc is a very fine program indeed; potentially one of the great Color Computer Programs." "... a very impressive product."*
> *—Scott L. Norman, HOT COCO*

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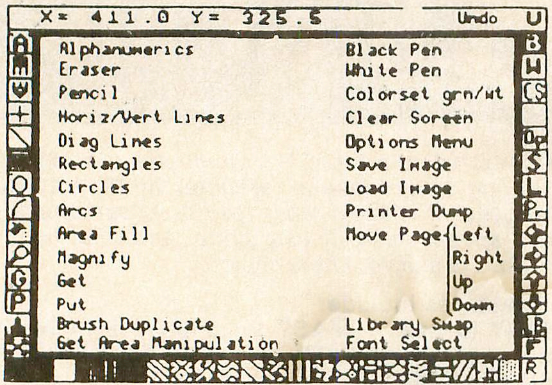
X= 411.0 Y= 325.5
Undo
Alphanumerics
Eraser
Pencil
Horiz/Vert Lines
Diag Lines
Rectangles
Circles
Arcs
Area Fill
Magnify
Get
Put
Brush Duplicate
Get Area Manipulation
Black Pen
White Pen
Colorset grn/wt
Clear Screen
Options Menu
Save Image
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C-ITOH(NEC), EPSON, GEMINI 10 - 10X

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VIDX - VIDEO DIGITIZER

Vidx connects between the video source and the RS-232 port of the color computer. No need for Y-cables or Multipacks! When VIDX is connected to your computer, you can digitize any source of video such as off air TV, video tape recorder, or live TV camera simply by issuing the proper command from the keyboard. The software used with VIDX is supplied on a non-protected RS format disk. The software has the following functions:

SINGLE OR MULTIPLE EXPOSURE
ABORT or RESUME SCAN
FRAME PICTURE
LOGICAL 'AND' SCREEN 2 & 1
READ/WRITE GRAPHICOM DISK
READ/WRITE RS-DOS DISK
READ/WRITE TO CASSETTE

VIDX-1-**$99.95**DIGITIZER & SOFTWARE
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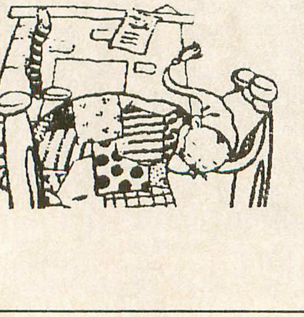
with two port RS-232 switcher, allows You to switch between VIDX and two other devices such as printer & modem
PLUS $3.00 POSTAGE



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```
1110 IFB$="E"THENV=RND(2):ONV GO
TO1090,1140:ELSEIFB$="S"THEN1140
1120 IFB$<>""ANDB$<>"E"ANDB$<>"S
"THENGOSUB6110
1130 NEXTH:GOTO7010
1140 PAINT(180,105),1,2:PAINT(18
0,120),1,2:COCO=0:TIMER=500:GOTO
660
1150 'LACK OF ENERGY
1160 OP$="S3C4BM180,111":A$="LAC
K@OF":GOSUB5000:OP$="BM180,121":
A$="ENERGY":GOSUB5000
1170 CIRCLE(210,63),30,2:CIRCLE(
210,63),30,2,.6,.15,.35:CIRCLE(2
10,68),5,2,1.4:CIRCLE(200,58),7,
2:CIRCLE(222,58),7,2:CIRCLE(212,
72),10,2,2.5,.05,.45:PAINT(210,3
4),3,2:PAINT(210,84),4,2:OP$="S4
C3BM120,187":A$="?":GOSUB5000
1180 FORH=1TO40:B$=INKEY$:GOSUB6
000
1190 IFB$="D"THEN1210ELSEIFB$<>"
"THENGOSUB6110
1200 NEXT:GOTO7010
1210 PAINT(180,105),1,2:PAINT(18
0,120),1,2:PAINT(210,34),1,1:TIM
ER=500:GOTO740
1220 GOTO1220
1230 'LACK OF OXYGEN
1240 OP$="S3C4BM180,111":A$="LAC
K@OF":GOSUB5000:OP$="BM180,121":
A$="OXYGEN":GOSUB5000
1250 OP$="S4C3BM120,187":A$="?":
GOSUB5000:B$="":GOSUB6000:COCO=1
:GOSUB660
1260 FORH=1TO4:CA=3:COCO=1:GOSUB
590:B$=INKEY$:GOSUB6000
1270 IFB$="B"THEN1290ELSEIFB$<>"
"THENGOSUB6110
1280 NEXT:GOTO7010
1290 PAINT(180,105),1,2:PAINT(18
0,120),1,2:R=0:COCO=0:CA=4:TIMER
=300:GOTO720
1300 'VALVE FAILURE
1310 OP$="S3C4BM190,111":A$="VAL
VE":GOSUB5000:OP$="BM180,121":A$
="FAILURE":GOSUB5000
1320 OP$="S4C3BM120,187":A$="?":
GOSUB5000:B$="":GOSUB6000:COCO=1
:CIRCLE(100,105),6,1:GOSUB660
1330 FORH=1TO4:COCO=1:GOSUB590:B
$=INKEY$:GOSUB6000
1340 IFB$="O"THEN1290ELSEIFB$<>"
"THENGOSUB6110
1350 NEXT:GOTO7010
1360 PAINT(190,105),1,2:PAINT(18
0,120),1,2:COCO=0:TIMER=300:GOTO
740
1370 'LEUKEMIA
```

```
1380 OP$="S3C4BM175,117":A$="LEU
KEMIA":GOSUB5000
1390 CIRCLE(200,47),15,4,1,.5,0:
CIRCLE(225,47),15,4,1,.5,0:CIRCL
E(214,25),30,4,2.3,.33,.45:CIRCL
E(210,25),30,4,2.3,.05,.2:CIRCLE
(211,41),22,4,2.5,.12,.38:PAINT(
210,92),2,4:OP$="S4C3BM120,187":
A$="?":GOSUB5000
1400 B$="":GOSUB6000:COCO=1:CIRC
LE(100,105),6,1:GOSUB660
1410 FORH=1TO4:COCO=1:GOSUB590:B
$=INKEY$:GOSUB6000
1420 IFB$="T"THEN1290ELSEIFB$<>"
"THENGOSUB6110
1430 NEXT:GOTO7010
1440 PAINT(210,33),1,1:PAINT(175
,117),1,2:COCO=0:R=0:TIMER=300:G
OTO740
5000 'DESSINE UNE LETTRE
5010 C$="":FORA=1TOLEN(A$):M$=MI
D$(A$,A,1):B=ASC(M$)-58:C$=C$+L$
(B):NEXT:DRAW OP$+";"+C$
5020 RETURN
6000 '? B$(SOLUTION)+MESSAGE
6010 COLOR2,1:LINE(130,175)-(255
,191),PSET,B:IFB$<>""THENPAINT(1
33,185),1,2:PAINT(163,140),1,2:P
AINT(175,156),1,2:OP$="S4C3BM133
,187"
6020 IFB$="M"THENA$="MASSAGE":GO
SUB5000:ELSEIFB$="S"THENA$="SHOC
K":GOSUB5000:ELSEIFB$="R"THENA$=
"RELAXATIVE":GOSUB5000:ELSEIFB$=
"E"THENA$="EXITATIVE":GOSUB5000
6030 IFB$="D"THENA$="DEXTROSE":G
OSUB5000:ELSEIFB$="O"THENA$="OPE
RATION":GOSUB5000:ELSEIFB$="B"TH
ENA$="BREATHING":GOSUB5000:ELSEI
FB$="T"THENA$="TRANSFUSE":GOSUB5
000
6040 RETURN
6050 COLOR2,1:LINE(160,130)-(255
,170),PSET,B
6060 OP$="S4C3BM186,144":A$="NOT
":GOSUB5000:OP$="BM172,164":A$="
ENOUGH":GOSUB5000
6070 RETURN
6080 COLOR2,1:LINE(160,130)-(255
,170),PSET,B
6090 OP$="S4C3BM160,144":A$="TOO
@MUCH":GOSUB5000:OP$="BM182,164"
:A$="TIME":GOSUB5000
6100 RETURN
6110 COLOR2,1:LINE(160,130)-(255
,170),PSET,B
6120 OP$="S4C3BM166,144":A$="BAD
;TRY":GOSUB5000:OP$="BM178,164":
A$="AGAIN":GOSUB5000
6130 RETURN
7000 'DEAD
7010 PMODE3,5:SCREEN1,0:PAINT(0,
0),4,2:OP$="S6C3BM176,118":A$="D
EAD":GOSUB5000
7020 IFINKEY$=""THEN7020ELSECLS:
PRINT@166,"AN OTHER CHANCE":PRIN
T@230,"(Y/N) ?"
7030 B$=INKEY$:IFB$=""THEN7030EL
SEIFB$="Y"THENPMODE3,5:PCLS:PMOD
E3,1:PCLS:SCREEN1,0:COLOR2,1:COC
O=0:GOTO360:ELSEEND
8000 'NEAT PRINT SUBROUTINE
8010 CX$=CHR$(32):LL=32
8020 CL=INT(LEN(N$)/32):CR$=RIGH
T$(N$,CL)
8030 IF LEN(N$)<LL THEN 8100
8040 IF MID$(N$,LL,1)=CX$ THEN81
00
8050 FOR CX=LL TO 1 STEP -1
8060 IF MID$(N$,CX,1)=CX$ THENCC
=CX:GOTO8080
8070 NEXT CX:GOTO8100
8080 PRINTLEFT$(N$,CC-1):N$=MID$
(N$,CC+1,LEN(N$)-CC-1)
8090 IF LEN(N$)>32THEN8050
8100 PRINTN$;CR$:RETURN
8110 END
```

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Farewell To A 'Pioneer,' A Look At Some Updates And A Review Of New Arrivals

By R. Wayne Day
Rainbow Contributing Editor

Ah, April! Spring is just around the corner for most folks (it's already here in Texas, though!) and the annual "clean up the computer room" effort is underway, right?

This month, the look at slow-scan television will have to be delayed since there are several other things we need to look at, most of which have happened on The Color SIG (CCSIG) on CompuServe.

Pioneer BBS System Goes Offline

Bob Rosen, president of Spectrum Projects and the operator of a multiple host BBS system in Woodhaven, N.Y., and San Jose, Calif., announced on the CCSIG in January that due to circumstances beyond his control, his Rainbow Connection BBS system is going offline.

Bob's assistant SYSOP is no longer able to work on the system, and since Bob has relocated himself to sunny southern California, he is unable to maintain the system as it should be. Additionally, by the time you read this, his San Jose BBS will probably also be offline.

Bob was one of the first BBS operators to support the CoCo, and his Woodhaven BBS featured some of the old hands in the CoCo community such as Shawn Jipp, Alfredo, Jorge Mir and others.

Just like the newspaper publishing business, I'm always saddened to see a long-running BBS system be turned off, and the loss of the Rainbow Connection will surely be felt by many.

Two New Versions of *WEFAX*

Marty Goodman's *WEFAX.BAS* program (THE RAINBOW February '85, Page 42) has been modified at least three times now: once to support the Okidata 92 printer, again for the Gemini 10 series of printers and the newest version which supports the Radio Shack printers. All of the new versions (*WEFAXG.BAS*, *WEFAXO.BAS* and *WEFAXR.BAS*) are resident in the DL2 database on The Color SIG if you're interested in downloading them directly. Or, if you'd like to take advantage of Marty's offer to supply a disk, check the February issue of THE RAINBOW for details on how to go about it and if you need one of the special versions, be sure and let him know.

If you're new to THE RAINBOW and haven't heard of *WEFAX.BAS*, pictures can literally be plucked out of the air with this program. *WEFAX.BAS* allows a person with a shortwave receiver to decode the audio directly from a facsimile station, such as a station that sends weather maps, without any hardware devices on a 64K Color Computer. The resulting pictures are nothing less than fantastic, and this program is a definite *must* for any serious, CoCo-equipped, shortwave listener.

Special thanks are due to Alexander "Sandy" Trevor, Glenn Little and Bill Tubbs for providing the new versions of *WEFAX*. Several other folks are also working on porting the program over to other printers, and there will probably be other versions available as well.

MIKEYTERM Debuts

Another program in the SIG/Access databases on the CCSIG is called *MIKEYTERM* and, as well-known author Dennis Kitsz put it, it's " . . . probably the finest Color Computer smart terminal program you *can't* buy."

MIKEYTERM is a public domain smart terminal program that's now

---

(Wayne Day, a traffic engineering technician for the city of Fort Worth, Texas, is the SYSOP of The Color SIG on CompuServe, the oldest CoCo communications service in the nation. Active in emergency medicine as a paramedic, he is also an amateur radio operator [WA5WDB].)

available to all users of the CCSIG. It requires a 64K CoCo or CoCo 2 and will work on a system with or without disks.

MIKEYTERM supports both capture buffer (ASCII) file transfers and XMODEM, allowing the CoCo user to get the most flexibility out of his online communications effort, since most terminal programs do not support any kind of binary file transfer (machine language programs, graphics screens, etc.).

In its present version, *MIKEYTERM* allows the user to set up three predefined strings that will be sent out of the serial port when various control keys are pressed. For instance, in my application, I have one setup to dial the local CompuServe computer node, another to dial Star-Text, the videotext service of the Fort Worth Star-Telegram, and another that contains my ID for use on CompuServe.

Other control functions allow the receiving and sending of a file from the program's buffer (up to 42K long) using XMODEM, or another control function allows that same buffer to be sent using a straight buffer dump (it takes the buffer and just sends it out at 300 Baud, pausing only when the remote host sends an X-On or X-Off).

MIKEYTERM also supports an offline printer, allowing you to print either all or part of the receive buffer.

A separate configuration program allows the user to customize *MIKEYTERM* with his choice of cursor colors (two are selected — one for when the receive buffer is closed, another when the buffer is open), as well as some other nice-to-have customizations.

At the time of this writing, *MIKEYTERM* has been a phenomenal success, not only in that so many folks have gotten it, but also that the SIG/Access databases are beginning to show the results of many new faces; those folks who had things to share with others, but just didn't seem to have the way to do it!

As good as *MIKEYTERM* is, though, it's important to note that it will probably not be the only terminal program you'll ever want to get. It doesn't have, for instance, complicated automatic login capability, and the file transfers are limited to the size of the buffer since *MIKEYTERM* does not read and write directly to and from the disk (or cassette) as some other terminal programs do. But, if you're looking for a hard-working, simple and useful terminal program with a lot of built-in flexibility, *MIKEYTERM* might just be what you're looking for.

If you're a CCSIG member (and membership is free to all CompuServe subscribers — just go to Page PCS-126 and join, if you haven't already), you can find the *MIKEYTERM* files in the DL4 (Telecommunications) database.

If you're going to download the BASIC loader version (that lets folks who use non-protocol programs such as *Colorcom/E, VIP Term, VideoText, Autoterm*, etc., get the programs), you'll need to download the following files:

```
MTERM1.BAS
MTERM2.BAS
MTERM3.BAS
```

The documentation (produced by SIG member Don Hutchinson of Atlanta) is contained in three files:

```
MTDOC1.TXT
MTDOC2.TXT
MTDOC3.TXT
```

> ***"There's beginning to be a veritable plethora of commercially produced CoCo OS-9 terminal programs, and from initial reports, some of them are very good indeed."***

And finally, you'll need the configuration program:

```
CONFIG.BAS
```

There are also some additional utilities that can be used with *MIKEYTERM* in the DL4 database — a quick `''BRO/KEY:MIKEYTERM''` will show you what's available.

There are two other ways you can get a copy of *MIKEYTERM*, especially useful if you're not a CompuServe subscriber. Mike has generously put this program in the public domain, and is encouraging folks to upload the program to their local BBS to share with all, so check on your local board to see if someone has already placed *MIKEYTERM* there for you.

Finally, if you don't want to, or can't download *MIKEYTERM* from one of the available online sources, Mike will make available on disk the *MIKEYTERM* files, including the completed *.BIN* version of *MIKEYTERM* (that's the one you actually `LOADM` and `EXEC`) if you will send him $10 for the package (including printed documents). The disk will also include the ASCII BASIC programs, the documentation files (on disk), and a description of each disk file. It's a complete package for you to use and distribute to a friend or BBS if you wish. His address is: Mike Ward, 1807 Cortez, Coral Gables, FL 33134.

Although the current version of *MIKEYTERM* runs only at 300 Baud, there are rumors from the Miami area that a new version of *MIKEYTERM* that supports the RS-232 ROM Pak (and the PBJ 2SP serial card) is in beta testing right now. An announcement of availability of that version of *MIKEYTERM* will be made both on the CCSIG and in this column.

What About OS-9?

One of the biggest reasons OS-9 and BASIC09 programs have been hard to come by on bulletin boards and the OS-9 Forum on CompuServe is the lack of any terminal programs that supported reading from and writing to OS-9 system disks. That's changing very rapidly, now.

There's beginning to be a veritable plethora of commercially produced CoCo OS-9 terminal programs, and from initial reports, some of them are very good indeed.

But what about public domain terminal programs for OS-9? Well, on The Color SIG and The OS-9 Forum (on CompuServe, GO PCS-18), three new additions to the OS-9 terminal family have arrived.

First on our list of new arrivals is *LTERM*, written in BASIC09 by Mike Randazzo.

LTERM requires the RS-232 Deluxe ROM Pak and works with the normal 32 x 16 character screen, *O-Pak*'s graphics screens or the *Word-Pak*. It supports uploading and downloading of ASCII files up to 12K long, and the documentation is built into the program — it's that simple to operate and use! *LTERM* operates only at 300 Baud.

LTERM has been modified so it will run at either 300 or 1200 Baud in a "dumb" terminal emulation. The BASIC09 file is called, appropriately enough, *DTERM.B09*, and is designed to be used with the RS-232 ROM Pak and the PBJ *Word-Pak*.

Last on our list of new OS-9 public domain programs is *HITERM*, produced by Bill Brady. *HITERM* is available in DL6 of both The Color SIG and the OS-9 SIG, and comes in two varieties: one version supports *O-Pak* and a modified 64 x 24 character graphics screen and the other version is designed specifically for use with the PBJ *Word-Pak*'s 80-column screen.

The PBJ *Word-Pak* files have the extension *.WPK*, while the *O-Pak* files are extended as *.B09*. All of the files are written in BASIC09 and require the RS-232 ROM Pak.

To run *HITERM*, you'd need:

```
HITERM.DOC
HITERM.WPK or HITERM.B09
MENU.WPK or MENU.B09
AUTOLO.WPK or AUTOLO.B09
UPLFIL.WPK or UPLFIL.B09
```

So, as you can see, whether you're using a commercially produced OS-9 terminal program or one of the various public domain programs available, there's little doubt that CoCo OS-9 is taking to online communications like a duck to water!

Why the Emphasis on Public Domain?

At this point in the column, you might be wondering why the emphasis on public domain programs this month?

Consider the first public computer bulletin board, Ward and Randy's BBS in Chicago, Ill. Prior to Ward and Randy coming online, CP/M users around the country were a very fragmented group of individuals, although there were the occasional users groups. Mainly, though, folks struck out on their own.

Then this electronic meeting hall we call a BBS appeared and for the first time, computer users could, at their convenience, check in to see what the latest gossip was, who was doing what and how, and could actually share programs among themselves. It was this spirit of "sharing the wealth" that has led, I believe, to the massive popularity of personal computers we see today.

You can see it in THE RAINBOW, too. I'm sure there aren't very many RAINBOW contributors who can quit their regular job and write programs exclusively as their sole source of income, so there's got to be another reason.

We all started pretty much the same on the CoCo wondering what we could do, experimenting with this concept or that, and we shared our ideas and programming examples with others.

This does not mean that commercial ventures and commercial programs have no place in the CoCo Community, of course they do! And we should help encourage those producers to keep on doing the fine job they've been doing so those of us who can't program a spreadsheet, or a database program, or even a terminal program, can continue to learn and grow with our favorite computer.

> ***"It was this spirit of 'sharing the wealth' that has led, I believe, to the massive popularity of personal computers we see today."***

The next time you're on your favorite BBS or online service downloading that nifty new program, remember to say "thanks" to those who have donated their handiwork for your enjoyment.

Your thanks will be all the payment the public domain author will get!

This 'N' That

In a little better news for the month, Bob Rosen of Spectrum Projects, mentions that *Colorcom/E* will be showing up in a radically new version by the time you read this. Bob hints at such things as XMODEM support, as well as some other goodies.

And, Phil Zweigert, the co-author of *Autoterm*, is getting ready to debut his new version of *Autoterm* which, incidentally, also includes XMODEM support.

Needless to say, CoCo communications have come a long way from the time *Videotext* on tape was the only terminal program available for the CoCo!

A rumor that reached me this winter which has very good ramifications for CoCo users is that the Express Order Service of Radio Shack, where you can order non-Tandy software through the local stores, has taken a good look at terminal programs for the Coco. It seems that, now, they won't even look twice at a terminal program unless it includes some sort of protocol file transfer, preferably XMODEM. That's something that can only help the average CoCo communicator!

I ran across an interesting *Videotext* service you might be interested in, especially if you live in or around the Boston, Mass., area.

The Yellow-Data-Pages is a free information service, available at (619) 489-4930 (300/1200 Baud). Among the data you'll find are listings for entertainment in and around Boston, classified ads, as well as quite a bit of off-the-cuff humor. It's well worth the call!

Looking Forward

The November '85 issue of THE RAINBOW will again be dedicated to telecommunications, and this year there are a couple of things I'd like to do.

First off, quite a few folks seem to be interested in becoming a SYSOP on their own BBS system, and quite often I am asked "What's available, how much is it, what do I need to run it, and where do I get it?" So, here's a call to all of you who are either selling a BBS package commercially, or have one you'd like to share with others.

Please drop me a line (my address is below) and give me the following information:

1) The name of the BBS package.
2) If it was not written by you, who wrote it.
3) The price or, if you're willing to share it with others, how they go about getting a copy of it.
4) The minimum system configuration (64K CoCo with two drives and RS-232 ROM Pak, etc).
5) Any system expansion *you* support (i.e., adding a hard disk or two more drives, real time clock, etc.).
6) What Baud rates, word lengths and parity the BBS supports or requires.
7) Does it include ASCII (capture buffer with control-R/control-T) up- and downloading?
8) Does it include protocol (XMODEM, DFT, etc.) up- and downloading?
9) Does it support online high resolution graphics for any terminal type?

10) Finally, if the BBS is online, anywhere, please give me a telephone number we can use to look at the product and get a general impression of how it works.

The deadline for getting all the information to me is August 1, 1985. Please note the information I need is separate from any product review on your BBS that you may desire. So, if you're selling a BBS package, by all means still send a review copy to THE RAINBOW editorial offices in Prospect, Ky.

Wrapping it Up

If all goes well, the June issue will have our delayed look at slow-scan television, along with a couple of other goodies.

Remember, you *can* contact me one of four ways: Wayne Day, P. O. Box 79074, Fort Worth, TX 76179-0074; CompuServe: 76703,376; MCI Mail: 201-7723; or through the editorial offices of THE RAINBOW. Please remember to enclose a SASE if you desire a quick response.

NEW LISTINGS

A/C	Number	City	BBS Name	Remarks
201	572-0617	Highland Park, NJ	Colorama	
201	657-0611	Lakehurst, NJ	Color Corner	
212	682-0681	New York City, NY	Grand Central Terminal	
301	736-9425	Forestville, MD	Colorama	
404	924-1248	Acworth, GA	CCBBS	
602	245-0488	Phoenix, AZ	CoCo Net	
609	448-1361	Larenceville, NJ	The Tardis	
609	448-7768	East Windsor, NJ	CoCo Enterprise	
619	368-3478	unknown, CA	Inner Connection	
714	350-2668	Fontana, CA	Color Corner	
716	248-2743	Rochester, NY	Spectra-80	
805	656-3746	unknown, CA	OS-9 Section	
803	669-3275	Florence, SC	Pro-Color Board 300/1200	
805	687-9400	Santa Barbara, CA	CoCo Corner #1 300/1200	HQ SYS
817	767-5847	Wichita Falls, TX	Commnet-80	
818	334-2864	Arcadia, CA	Color America BBS	

CHANGE LISTINGS

A/C	Number	City	BBS Name	Remarks
219	234-9717	Mishawaka, IN	Sagcom	New Phone #
201	725-5028	Manville, NJ	C.C.I.E.	Now HQ SYS
212	441-3755	Woodhaven, NY	Rainbow #1	Now Offline
212	441-3766	Woodhaven, NY	Rainbow #2	Now Offline
212	441-5719	Woodhaven, NY	Rainbow #3	Now Offline
212	441-5907	Woodhaven, NY	Rainbow #4	Now Offline

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RADIO SHACK EXT. BASIC $ 39.95

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Some Educational Programs To Help Make Learning Fun

By Fred B. Scerbo
Rainbow Contributing Editor

(Editors Note: If you have an idea for the "Wishing Well," submit it to Fred c/o THE RAINBOW. Remember, keep your ideas specific, but don't forget that this is BASIC. All programs resulting from your wishes are for your use but remain the property of the author.)

Since the first part of 1985, we have covered a number of different topics in the "Wishing Well." January was graphics, February was speech synthesis, and last month saw the return of a CoCo game.

For this issue, I will be offering two granted wishes in the educational field. These programs are in response to a combination of suggestions from teachers I have received letters from or have met in the workshops I have been presenting. The best part of both programs is that for the first time, they let you share in some of the credit. These two programs are called *HOMONYM* and *MATCHING*.

(Fred Scerbo is a special needs instructor for the North Adams Public Schools. He holds a master's in education and published some of the first software available for the Color Computer through his software firm, Illustrated Memory Banks.)

Not so Ancient History

Readers of the "Wishing Well" will remember back in April of 1984 I presented the first in a series of screen quiz programs. The first set was designed to offer a random multiple choice quiz using data supplied by the user. The beauty of these programs was that the routines were already in place. The user needed only add the `DATA` lines to create an endless supply of tailor-made educational programs which dealt with material *you* wanted, not what some programmer thought was important.

Since that time, I have received letters from parents and teachers around the country who have started using this material throughout the year. The results have more than exceeded my initial hopes for the programs.

The success of those programs prompted later versions including true and false, verb tenses and a number of line printer programs to duplicate the same results on paper. The end result has been that more parents, students and teachers have found a really time-efficient way to use their Color Computers for real learning.

The Wish(es)

In spite of the success of these programs, I have received suggestions and requests from many individuals who have found the programs valuable, but not quite able to zero in on the skills they wanted to teach.

One teacher in particular was in need of reviewing homonyms for her English grammar students. Homonyms, you remember, are words that have the same sound, but different spellings and meanings, such as beech and beach, or their, there and they're. At first, I suggested she use the true and false quiz with statements such as:

> A beech is a stretch of land by the water.
> True or False?

This would not quite fit the bill, so I decided to come up with an entirely new program that would deal exclusively with homonyms. This program would work somewhat like the multiple choice programs, but allow the user to focus on just two choices, rather than the five random choices presented in *MULTIPLE*. (Of course, *HOMONYM* has several other uses, too, but I'll get to those later.)

Another frequent request has been for a program that would do on the screen what the *QUIZMAKR* program did for paper. That program was able to create a matching test with terms and definitions in two different columns, much like the old "draw a line from the word to the correct definition" type quiz you may recall from elementary school days. Since the multiple choice quizzes only had one term at a time, a totally new program was required to meet this need. With just a little effort, the program *MATCHING* was created.

Those of you who are familiar with the screen quiz programs mentioned here will notice that some of the routines used in both *HOMONYM* and *MATCHING* have been used again. These routines, in particular, are the ones which create the random order of selection and the ones which prevent word breakup at the right-hand side of the screen.

Since these routines are very effective, they serve as the nucleus of most of my educational programs. As with the latter programs, these new ones only require you to supply information starting in Line 1000. The rest of the body of the program is left alone. (Therefore, you should take great care, when deleting my sample information, not to kill any other of the vital lines earlier on in the program.)

Your Name in Lights

A number of readers who have written or called have mentioned that in using the screen quiz programs they have included a line or print statement which indicates `DATA WRITTEN BY JOHN DOE`, or something to that effect. After giving it a little thought, I came to the conclusion I had been taking a little too much of the credit when you decide to use these programs with your students or your own children. If you've taken the time to research the information needed for a quiz, you should get a little of the credit when the title card appears on the screen.

With this in mind, both of these programs have been designed with a routine that will include your name in the title card when it appears at the start of the program. The bottom of the screen will say:

```
TERMS BY ''YOUR NAME HERE''
```

The actual listings here will say `YOUR NAME HERE` rather than a real name. Upon typing in the listing, you may add your name to the `DATA` line found at 5000.

As you may recall, our procedure has always been to include the word `END`, which is our flag to stop the program from reading `DATA` followed by the title of this quiz that you want on the screen. From now on, you will have to add a third piece of information in Line 5000 which will be your own name:

```
5000 DATA END, Title you want
  to use, YOUR NAME HERE
```

The end result will cause your name to appear in the title card just as if you had written it in there in the first place. I think you will find this feature to be very handy as it adds a nice personal touch to your efforts. (I may even include this routine in some games, such as a line like: `PROGRAM LINES TYPED IN BY ''YOUR NAME HERE''`. Wouldn't your friends get a kick out of that?)

Using the Homonym Quiz

If you type in the listing exactly as it appears, you will get a brief quiz involving a number of terms which I have selected. However, to take full advantage of this program's potential, you should design a list of definitions and homonyms you would like to see your child or student(s) master. The order of data entry should be:

> ***". . . there are several uses for this program which can make it valuable for math, science, history or even teaching a foreign language."***

```
1000 DATA ''definition of the
  word'', ''correct choice'',
  ''incorrect choice''
```

Therefore, we are supplying three pieces of information for our program to read for each problem presented. The maximum number of definitions and terms should be 50. Remember, the order of presentation will be different every time the program is run.

The appearance of the correct choice in either the A) or B) position will also be random. The user is asked to match A) or B) to the printed definition; only A) or B) may be pressed.

In previous programs, I have allowed you to stop the quiz by pressing 'S.' This was logical in programs where the numbers one through five were the only keys pressed. This time, however, since we are using A) and B), I have made the '@' key the stop button. Since 'A' is adjacent to 'S,' the odds of accidentally hitting 'S' instead of 'A' would be very great. Switching to the '@' key prevents us from having the student stop the program by mistake.

As mentioned earlier, there are several other uses for this program which can make it valuable for math, science, history or even teaching a foreign language. Rather than think of this as a homonym quiz, think of it as a limited multiple choice quiz. Say we were to use this for history. Your `DATA` might appear like this:

```
1000 DATA ''WHAT YEAR DID
  COLUMBUS LAND IN THE NEW
  WORLD?'',''1492'',''1493''
```

If we used this type of `DATA` with *MULTIPLE*, the screen quiz program, our choices might include other information such as names and terms, depending on what kind of `DATA` we used. This way, we can limit our choices to a definite field with greater accuracy.

We could also use it for math by constructing `DATA` such as:

```
1000 DATA ''How much is 27 plus
  22?'',''49'',''47''
          or
1000 DATA ''What is the correct
  formula for finding the area
  of a triangle?,''A=(h x w)/
  2'',''A=l x w''
```

Foreign languages can be covered in this manner:

```
1000 DATA ''GOOD DAY'',
   ''BONJOUR'',''BONSOIR''
```

The uses are therefore only limited by your own ability to construct `DATA` within these confines. Since the value of *HOMONYM* lies in repetition, this program can be a valuable educational tool when a great deal of review is required for learning information. This helps to make it a little more fun.

Using *MATCHING*

Like *HOMONYM, MATCHING* is limited to the review of 50 sets of terms. Our only restriction is that our terms must always be entered in sets of five, that is: 5, 10, 15, 20, 25, 30, etc. Each term and matching one word definition can be no longer than 13 characters long. If you use multiples other than five, the program might tend to lock up; just keep in multiples of five and you will have no problem.

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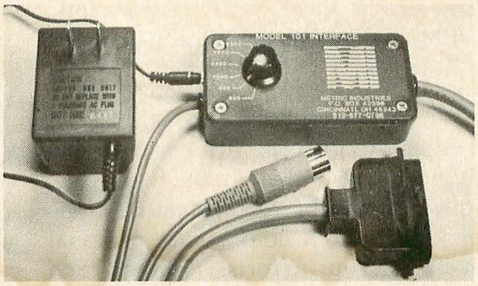
The Model 101 is a serial to parallel interface intended for use with a COCO and any Centronics compatible parallel input printer. The 101 has 6 switch selectable baud rates (300-9600). It comes with a "UL" listed power supply that can be unplugged from the interface if your printer supplies power (Most do). The 101 is only 4" x 2" x 1" and comes with all cables and connectors for your computer and printer.



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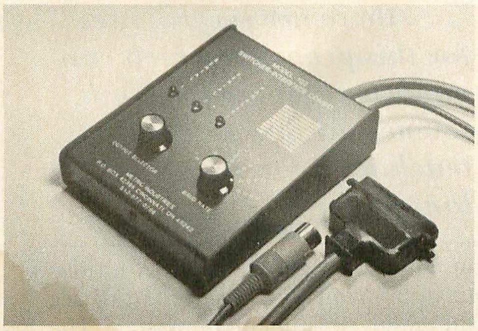

The Model 101, 102 and 103 will work with any level COCO basic, any memory size 4K-64K and are covered by a 180 day warranty.

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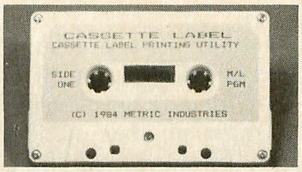

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As with all our shell programs, to enter your own DATA, type:

```
DEL 1000-
```

Use this also with *HOMONYM* to delete my DATA. The following examples may appear familiar to you as they always serve as a good example. Say we wanted a quiz on antonyms. You might wish to use DATA in this fashion:

```
1000 DATA UP,DOWN
1010 DATA YES,NO
1020 DATA ALWAYS,NEVER
1030 DATA HOT,COLD
1040 DATA NIGHT,DAY
```

This would be our first set of five terms. If we were to use 10, then as the sets of five were selected, they would never be exactly the same set of five. The results or groups would always be mixed at random.

We could use *MATCHING* for math in this fashion:

```
1000 DATA 4 + 4,8
1010 DATA 3 + 9,12
1020 DATA 7 + 6,13
1030 DATA 2 + 5,7
1040 DATA 8 + 9,17
```

Just be sure your answers in the right column are not duplicated at any point. You could also use this with formulas, chemical symbols for chemistry, changing digits to written numbers, and so on.

As you can see by now, these types of programs can cover just about anything you want, provided you stay within the guidelines. I think you should have the hang of it by now, but if any of this seems confusing, check back on previous issues.

One last point to keep in mind is that our commas are used to separate our DATA. If you must use commas as part of your punctuation, be sure to wrap each piece of DATA in quotation marks and then use a comma *outside* the quotes to separate them. Follow these rules and you should have no problems.

Conclusion

Give these two listings a try and see if they are of any use in helping use your CoCo for educational purposes. I have a number of other ideas along these lines still percolating. If you have any other suggestions for educational ideas, feel free to drop me some suggestions.

150 43
310 157
500 26
740 3
END 35

Listing 1:

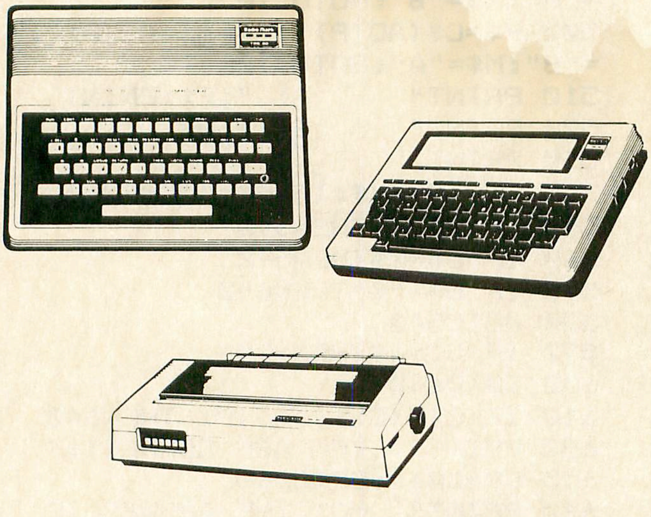
```
10 '****************************
20 '*    QUIZ ON HOMONYMS      *
30 '*    BY FRED B.SCERBO      *
40 '*   COPYRIGHT (C) 1985     *
50 '*     149 BARBOUR ST.      *
60 '*  NORTH ADAMS, MA 01247   *
70 '****************************
80 CLEAR 2000
90 DIM AO(51),A$(51),B$(51),C$(5
1),NP(51)
100 CLS0:FORI=1TO32:PRINTCHR$(17
2);:NEXT
110 FORI=1088TO1183:READA:IFA=0T
HENA=128
120 POKEI,A:NEXT:FORY=0TO64STEP3
2:FORI=1192TO1206:READA:POKEI+Y,
A:NEXTI,Y
130 PRINT@288,"";:FORI=1TO32:PRI
NTCHR$(172);:NEXT:FORI=0TO17:SET
(0,I,3):SET(63,I,3):NEXT
140 FORI=1TO17:READA:POKE1350+I,
A:NEXT:FORI=1TO19:READA:POKE1381
+I,A:NEXT
150 DATA,239,224,239,,239,236,23
9,,239,226,225,239,,239,236,239,
,239,235,224,239,,235,224,231,,2
39,226,225,239,
160 DATA,239,236,239,,239,224,23
9,,239,228,232,239,,239,224,239,
,239,228,235,239,,228,239,232,,2
39,228,232,239,
170 DATA,236,224,236,,236,236,23
6,,236,224,224,236,,236,236,236,
,236,224,228,236,,224,236,224,,2
36,224,224,236,
180 DATA 175,172,175,128,175,160
,175,128,164,175,168,128,172,172
,175
190 DATA 175,161,175,128,175,160
,175,128,160,175,160,128,163,172
,160
200 DATA 172,172,174,128,172,172
,172,128,164,172,168,128,172,172
,172
210 DATA2,25,32,6,18,5,4,32,2,46
,32,19,3,5,18,2,15
220 DATA3,15,16,25,18,9,7,8,20,3
2,40,3,41,32,32,49,57,56,53
230 SW=30:KZ=RND(-TIMER)
240 FORJ=1TO51
250 READ A$(J),B$(J),C$(J):IF A$
(J)="END" THEN270
260 NEXTJ
270 REM START QUIZ
280 NM$="TERMS BY "+C$(J):TL$=B$
(J):P=LEN(TL$):PRINT@431-INT(P/2
),TL$;:P=LEN(NM$):PRINT@463-INT(
P/2),NM$;
290 FOR WW=1TO2000:NEXTWW
300 J=J-1
310 FORI=1 TO J
320 AO(I)=RND(J)
330 IF NP(AO(I))=1 THEN320
340 NP(AO(I))=1:NEXTI
350 FOR Y=1TO1000:NEXTY
360 CLS
370 FOR P=1TOJ
380 CLS:PRINT:PRINT"  HOMONYM EX
AMPLE NUMBER";P"."
390 PRINT
400 PRINT"  WHICH TERM GOES WITH
 THIS       DEFINITION ?":PRINT
410 JK$=A$(AO(P))
420 IF LEN(JK$)<=SW THEN 460
430 FOR T= SW TO 0STEP-1:IF MID$
(JK$,T,1)=" "THEN450
440 NEXT T:GOTO460
450 L$=LEFT$(JK$,T):PRINT"  ";L$
:JK$=RIGHT$(JK$,(LEN(JK$))-T):GO
TO420
460 PRINT"  ";JK$
470 PRINT
480 D=RND(20):IFD=>11THEN500
490 F$=B$(AO(P)):H$=C$(AO(P)):J$
="A":M$="B":GOTO510
500 F$=C$(AO(P)):H$=B$(AO(P)):J$
="B":M$="A":GOTO510
510 PRINT"     A) ";F$:PRINT
520 PRINT"     B) ";H$
530 PRINT
540 G$=INKEY$:IF G$=""THEN540
550 IF G$=J$THEN590
560 IF G$=M$THEN590
570 IF G$="@"THEN690
580 GOTO540
590 IF G$=J$THEN620
600 GOTO640
610 IF C(F(G))<>AO(P) THEN640
620 PRINT"  YOU ARE CORRECT!"
630 CR=CR+1:GOTO660
640 PRINT"  NO! THE ANSWER IS ";
B$(AO(P));"."
650 IR=IR+1
660 PRINT:PRINT"  (PRESS <ENTER>
 TO CONTINUE .)";
670 IFINKEY$<>CHR$(13)THEN670
680 NEXTP
690 CLS:PRINT:PRINT:PRINT
700 PRINT"    NUMBER CORRECT = "
CR
710 PRINT
```

```
720 PRINT"     NUMBER WRONG   = "
IR
730 J=CR+IR:IFJ=0THENJ=1
740 PRINT:PRINT"     STUDENT SCOR
E  = ";INT(CR*100/J);"%"
750 PRINT:PRINT"     ANOTHER TRY
(Y/N)";
760 W$=INKEY$:IF W$=""THEN760
770 IF W$="Y" THEN RUN
780 IF W$="N" THEN CLS:END
790 GOTO760
990 REM ENTER DATA AT LINE 1000
1000 DATA  A LEVEL STRETCH OF LA
ND BY THE WATER,BEACH,BEECH
1010 DATA A KIND OF NUT TREE,BEE
CH,BEACH
1020 DATA A HURTING SENSATION,PA
IN,PANE
1030 DATA THE EDGE OF A WINDOW,P
ANE,PAIN
1040 DATA INEXPENSIVE,CHEAP,CHEE
P
1050 DATA NOISE MADE BY A SMALL
BIRD,CHEEP,CHEAP
5000 DATA END,WORDS THAT SOUND T
HE SAME,'YOUR NAME HERE'
```

```
170 ......128
310 .......13
490 ......134
770 .......19
END .....102
```

Listing 2:

```
10 '****************************
20 '*      MATCHING  QUIZ       *
30 '*     BY FRED B.SCERBO      *
40 '*    COPYRIGHT (C) 1985     *
50 '*      149 BARBOUR ST.      *
60 '*  NORTH ADAMS, MA 01247    *
70 '****************************
80 CLEAR 2000
90 DIM AO(51),A$(51),B$(51),NP(5
1),N$(5)
100 N$(1)="1":N$(2)="2":N$(3)="3
":N$(4)="4":N$(5)="5"
110 CLS0:FORI=1TO16:PRINTCHR$(16
8)CHR$(152);:NEXT
120 FORI=1088TO1183:READA:IFA=0T
HENA=128
130 POKEI,A:NEXT:FORY=0TO64STEP3
2:FORI=1192TO1206:READA:POKEI+Y,
A:NEXTI,Y
```



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```
140 PRINT@288,"";:FORI=1TO16:PRI
NTCHR$(168)CHR$(152);:NEXT
150 FORI=1TO17:READA:POKE1350+I,
A:NEXT:FORI=1TO19:READA:POKE1381
+I,A:NEXT
160 DATA 223,210,209,223,128,215
,220,219,128,220,223,220,128,223
,220,220,128,223,208,223,128,223
,128,223,219,208,223,128,223,220
,220,128
170 DATA 223,212,216,223,128,223
,220,223,128,208,223,208,128,223
,208,128,128,223,220,223,128,223
,128,223,212,219,223,128,223,212
,223,128
180 DATA 220,208,208,220,128,220
,208,220,128,208,220,208,128,220
,220,220,128,220,208,220,128,220
,128,220,208,212,220,128,220,220
,220,128
190 DATA 175,172,175,128,175,160
,175,128,164,175,168,128,172,172
,175
200 DATA 175,161,175,128,175,160
,175,128,160,175,160,128,163,172
,160
210 DATA 172,172,174,128,172,172
,172,128,164,172,168,128,172,172
,172
220 DATA2,25,32,6,18,5,4,32,2,46
,32,19,3,5,18,2,15
230 DATA3,15,16,25,18,9,7,8,20,3
2,40,3,41,32,32,49,57,56,53
240 SW=30:KZ=RND(-TIMER)
250 FORJ=1TO51
260 READ A$(J),B$(J):IF A$(J)="E
ND" THEN290
270 NEXTJ
280 REM START QUIZ
290 READ C$
300 NM$="TERMS BY "+C$:TL$=B$(J)
:P=LEN(TL$):PRINT@431-INT(P/2),T
L$;:P=LEN(NM$):PRINT@463-INT(P/2
),NM$;
310 FOR WW=1TO2000:NEXTWW
320 J=J-1
330 FORI=1 TO J
340 AO(I)=RND(J)
350 IF NP(AO(I))=1 THEN340
360 NP(AO(I))=1:NEXTI
370 FOR Y=1TO1000:NEXTY
380 CLS
390 FOR P=1 TO J STEP5
400 CLS
410 FOR E=1TO5
420 F(E)=RND(5)
430 IF E=5 THEN450
440 IF F(E)=E THEN 420
450 FOR K=E-1 TO 0 STEP-1:IF F(K
```

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```
)=F(E) THEN420
460 NEXTK:NEXTE
470 PRINT"MATCH THE CORRECT LETT
ER WITH   THE CORRECT NUMBER.":P
RINT
480 FOR Z=0TO4
490 PRINTCHR$(Z+65);") ";A$(AO(Z
+P)),N$(Z+1);") ";B$(AO(F(Z+1)+P
-1))
500 NEXTZ
510 PRINT
520 FORZ=1TO5
530 PRINT"WHICH NUMBER GOES WITH
 ";CHR$(64+Z);" ? ";
540 K$=INKEY$:K=VAL(K$)
550 IF K<1 THEN540
560 IF K>5 THEN540
570 PRINT" ";K$
580 IF F(K)=Z THEN TR=TR+1
590 IF F(K)<>Z THEN TW=TW+1
600 NEXTZ
610 FOR K=1TO1500:NEXTK
620 CLS:PRINT"THE CORRECT MATCHE
S ARE:":PRINT
630 FORZ=0TO4
640 PRINTCHR$(Z+65);") ";A$(AO(Z
+P)),N$(Z+1);") ";B$(AO(Z+P))
650 NEXTZ
660 CR=CR+TR:IR=IR+TW
670 PRINT:PRINT"YOU MATCHED ";TR
;" CORRECTLY."
680 TR=0:TW=0
690 PRINT:PRINT"PRESS '@' TO CON
TINUE THE QUIZ.";
700 G$=INKEY$:IFG$=""THEN700
710 IF G$="@"THEN730
720 GOTO700
730 NEXTP
740 CLS:PRINT:PRINT
750 PRINT"     NUMBER CORRECT = "
CR
760 PRINT
770 PRINT"     NUMBER WRONG   = "
IR
780 PRINT:PRINT"     STUDENT SCOR
E  = ";INT(CR*100/J);"%"
790 PRINT:PRINT"     ANOTHER TRY
(Y/N)";
800 W$=INKEY$:IFW$=""THEN800
810 IF W$="Y" THEN RUN
820 IF W$="N" THEN 840
830 GOTO800
840 CLS:END
990 REM ENTER DATA AT LINE 1000
1000 DATA EPILOGUE,CONCLUSION
1010 DATA GOBLET,CUP
1020 DATA MAROON,ABANDON
1030 DATA PIOUS,HOLY
1040 DATA CRIMP,FOLD
1050 DATA BAFFLE,CONFUSE
1060 DATA DECLINE,REFUSE
1070 DATA OBSTRUCT,BLOCK
1080 DATA REDOUBT,RETREAT
1090 DATA SUBMIT,YIELD
5000 DATA END,SAMPLE VERSION OF
MATCHING QUIZ,'YOUR NAME HERE'
```

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One-Liner Contest Winner . . .

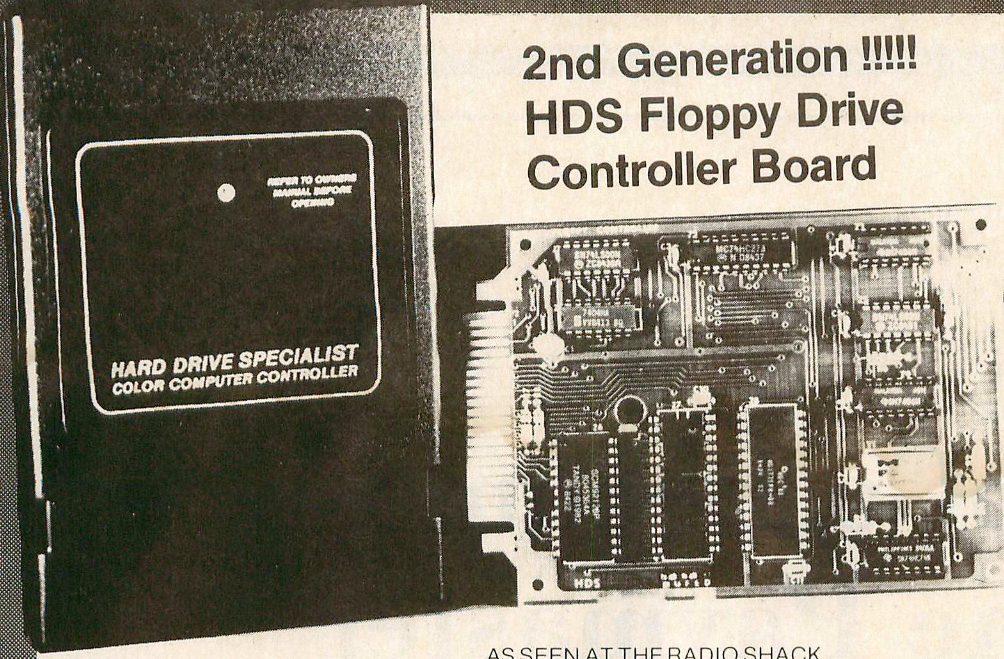
The Track is a car race game using the right joystick. Your car is represented by a flashing arrow at the bottom of the screen. The track scrolls vertically, and you control it (*not* the car) with the joystick.

The listing:

```
0 CLS0:B=1472:C=16:FORX=0TO1STEP
0:W=INT(JOYSTK(0)/4)+1:POKEB+C,1
28:A=2-RND(3):C=C+A:PRINTSTRING$
(W," ");CHR$(191);STRING$(13,CHR
$(128));CHR$(191):IFPEEK(B+C)<>1
28THENCLS:PRINT@234,"TIME =";S:F
ORM=1TO96STEP5:SOUNDM,1:NEXT:RUN
ELSEPOKEB+C,94:S=S+1:NEXT
```

Joel Doucet
Yarmouth, Nova Scotia

(For this winning one-liner contest entry, the author has been sent copies of both *The Rainbow Book Of Simulations* and its companion *Rainbow Simulations Tape*.)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Completed and Tested Board without ROM .... (Includes Case)	**$119**
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Parts Kit For Bare Board without ROM	**$ 40.**
Radio Shack ROM	**$ 20.**

AS SEEN AT THE RADIO SHACK
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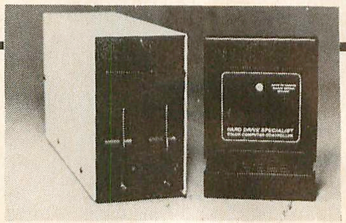

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HDS has licensed the ROM from Radio Shack to be able to offer alternative operating systems pre-blown ready for installation. The first of what we hope to be a wide range of options is ADOS. ADOS is a product of SpectroSytems of Miami Florida and if fully supported by the author. The HDS version of ADOS supports 2 drives, 40 track, 6ms trk-to-trk drives only, either Single Sided or Double Sided. The ADOS package comes complete with original documentation and diskette from SpectroSystems and can be installed in our Drive Controller Board at purchase time for no additional charge.

ADOS/HDS 24 pin ROM .... (useable in all drive controllers on the market)	**$ 50.**
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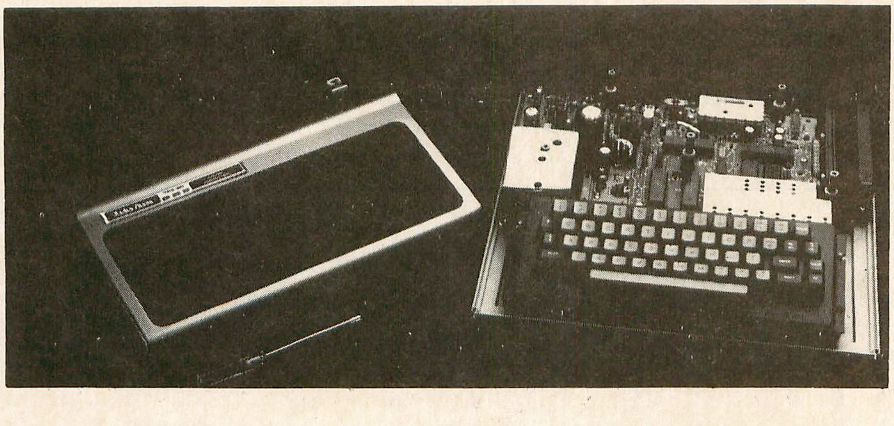

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The Fantastic Keytronic Keyboard is now being manufactured only for Hard Drive Specialist. It is the only keyboard for the Color Computer known on the market that does not use membrane switches. The KB500 uses a capacitance foam switch. This type of switch will never give keyboard bounce and last much longer than all other types. The KB500 is also the only keyboard that will fit all versions of the color computer weather it is a A, B, C, D, E, F, ET, TDP-100, COCO IIA, or COCO IIB. One keyboard fits all with out risk of getting the wrong version, and there is no need to do any modifications to your case. Additional features include a higher spring force on the break and clear key to reduce the possibility of a disastrous key-stroke, sculptured keys, low profile, "pips" on home row keys. The "PF" function key comes with documentation and a sample program. The Keytronics/HDS keyboard list price was $89. when it was offered through Keytronics. **Our price on it is only $69.** plus $3. for shipping.

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The second of a two-part series

CoCo Becomes The Paymaster

By Dennis H. Weide

Last month, I explained the data files used in the payroll package and the programs that manage them. This month, I'll explain the two programs which compute the payroll, update the data files and print the paychecks.

First, you need to key in program listings 1 and 2 and save each to disk using the filename as it appears in Line 1000 of each program. You don't have to key in `REM`arks, but as I said last month, they'll make it easier to modify the program later.

Make sure you have backup copies of all programs and data files before you try to use them. The easiest way to do this is to get a second blank disk and use the `BACKUP` command as explained in the Disk BASIC manual. Also, if you are using Radio Shack disk drives and controllers, you should consider using a spare directory program since these drives are known for crashing directories. I use a J&M controller and Teac disk drive, so I haven't experienced any directory problems. When you're satisfied that you have enough backup, you're ready to go.

Compute a Payroll

Let's try the program now using the data files you created last month and some sample data. Remember, once you create the employee and employer data files, you don't want to erase them. At the beginning of each new year, use a new diskette and initialize it using the `DSKINI0` command, then run *EMPLOYER* and *EMPLOYEE* again to create the two data files on the new disk.

To compute a payroll, load the diskette into the drive and type `RUN ''COMPUTE''` and ENTER. The *COMPUTE* program will load and run from disk. When the main menu is displayed, select option 1. You'll first be prompted for the pay period date. Enter it using the first three letters of the month followed by the day and year. Don't use any commas in the entry because the computer will consider your entry as multiple inputs and tell you EXTRA IGNORED. You'll be asked if this is a new month (except in January). If this is the first payday of a new month, answer 'Y.' The computer will copy all

(Dennis Weide is a communications technician for AT&T Communications where he is assigned to the electronic switching system. His hobbies include designing and making toys and computers.)

Table 1

Payroll Codes

Code Name	Computation	Flags Set
RH regular hours	HP*RH	none
OH overtime hours	HP*RH*1.5	none
PA paid absent	HP*PA	days absent
PV paid vacation	HP*PV	days vacation
HX holiday excused	HP*8	none
HW holiday worded	(HP*8)+(HP*HW*1.5)	none
UA unpaid absent	none	days absent

necessary data from the previous month to the new month.

When these prompts have been answered, the first employee's name and social security number will be displayed on the screen. A prompt will ask if the employee should receive a paycheck for this pay period. If you answer 'N,' the program will flag the record so that all data stored on disk is locked in. No changes will be made to the employee's payroll record. If you answer 'Y,' the program will prompt you for each day of the week. Table 1 shows the codes and their meanings; Figure 1 shows some sample entries. For any days the employee was scheduled off, just press ENTER.

You can enter up to two payroll codes per workday, but the format must be strictly adhered to. Enter the hours first followed by a two-character code from Table 1 and slash (/). If a second code is required, it is entered immediately after the slash. If an employee worked a regular eight hour shift on Tuesday, the entry for that day would look like this:

```
8RH/
```

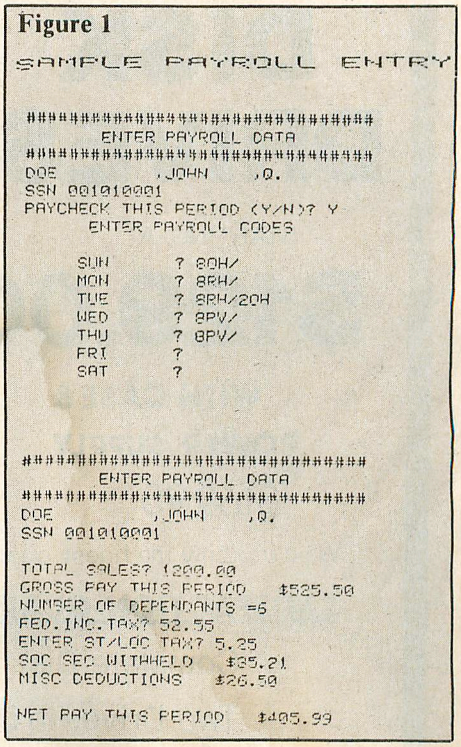
meaning eight hours at regular hourly pay. If the employee had two hours overtime also, the entry would look like this:

```
8RH/2OH
```

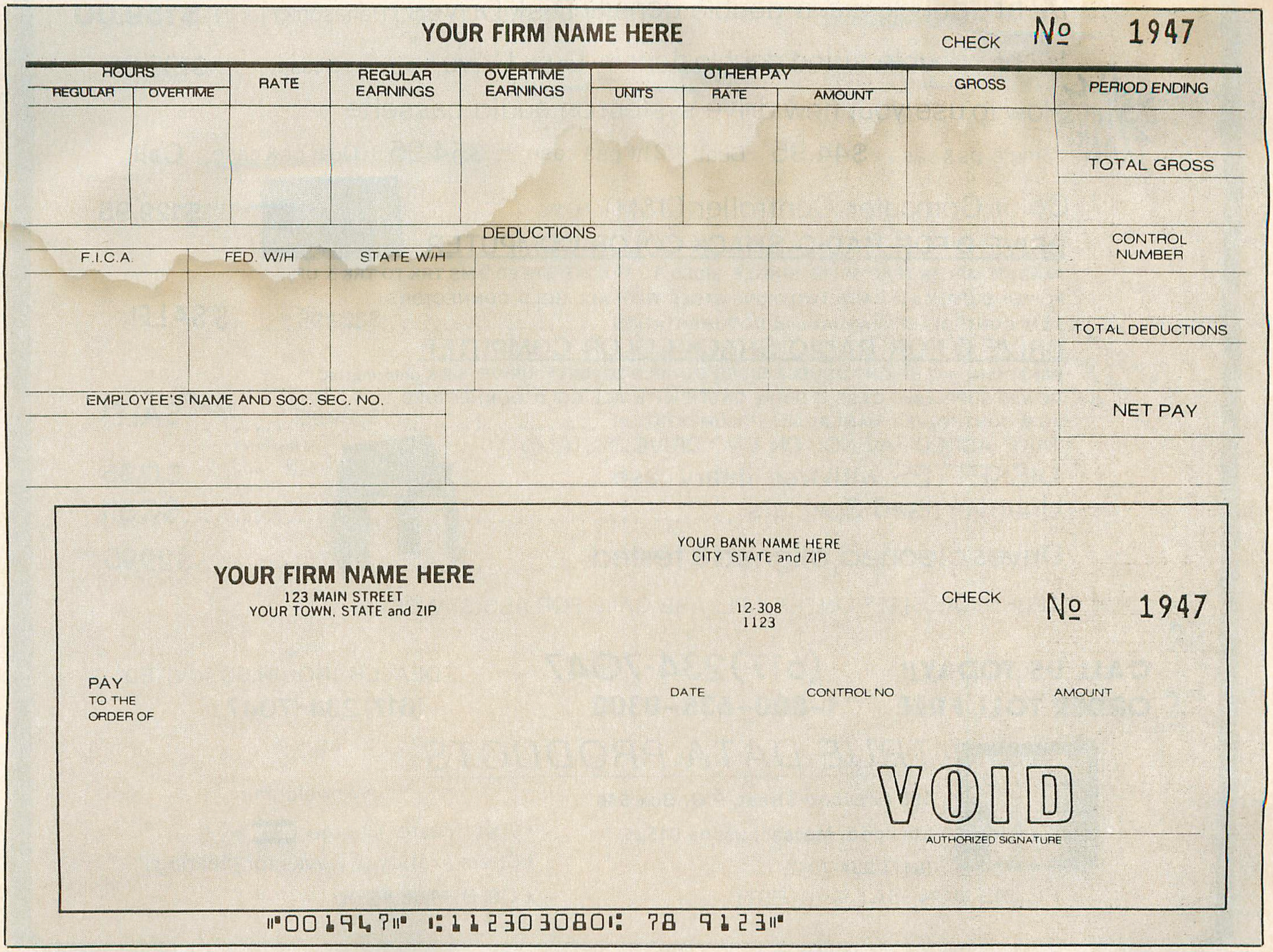
meaning eight hours at regular hourly pay and two hours at overtime pay. Don't confuse the letter 'O' with zeros. Notice that the slash is not used after the second code entry.

If your company pays time and a half for Saturdays and Sundays, enter the pay for these days as overtime hours (OH). If your holiday pay rate is less than that shown in Table 1, you can use a different code for holidays or change the formula in the program.

Figure 1



```
SAMPLE PAYROLL ENTRY

 #################################
        ENTER PAYROLL DATA
 #################################
 DOE            ,JOHN     ,Q.
 SSN 001010001
 PAYCHECK THIS PERIOD (Y/N)? Y
       ENTER PAYROLL CODES

      SUN        ? 8OH/
      MON        ? 8RH/
      TUE        ? 8RH/2OH
      WED        ? 8PV/
      THU        ? 8PV/
      FRI        ?
      SAT        ?


 #################################
        ENTER PAYROLL DATA
 #################################
 DOE            ,JOHN     ,Q.
 SSN 001010001

 TOTAL SALES? 1200.00
 GROSS PAY THIS PERIOD   $525.50
 NUMBER OF DEPENDANTS =6
 FED.INC.TAX? 52.55
 ENTER ST/LOC TAX? 5.25
 SOC SEC WITHHELD   $35.21
 MISC DEDUCTIONS   $26.50

 NET PAY THIS PERIOD   $405.99
```



YOUR FIRM NAME HERE

CHECK № 1947

HOURS		RATE	REGULAR EARNINGS	OVERTIME EARNINGS	OTHER PAY			GROSS	PERIOD ENDING
REGULAR	OVERTIME				UNITS	RATE	AMOUNT		

TOTAL GROSS

DEDUCTIONS

F.I.C.A.	FED. W/H	STATE W/H				

CONTROL NUMBER

TOTAL DEDUCTIONS

EMPLOYEE'S NAME AND SOC. SEC. NO.

NET PAY

YOUR FIRM NAME HERE
123 MAIN STREET
YOUR TOWN, STATE and ZIP

YOUR BANK NAME HERE
CITY STATE and ZIP

12-308
1123

CHECK № 1947

PAY
TO THE
ORDER OF

DATE
CONTROL NO
AMOUNT

VOID

AUTHORIZED SIGNATURE

⑈001947⑈ ⑆112303080⑆ 78 9123⑈

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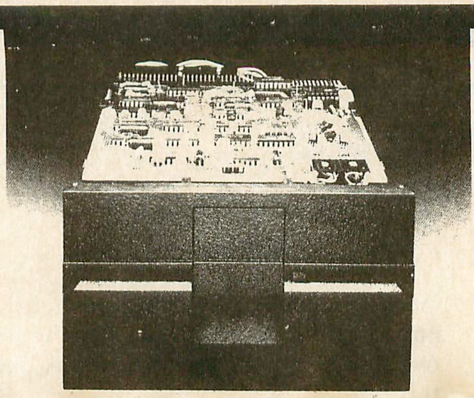

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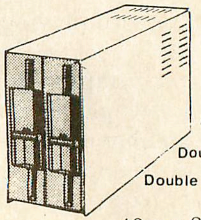

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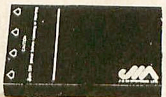

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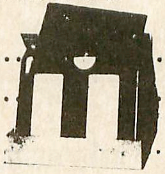

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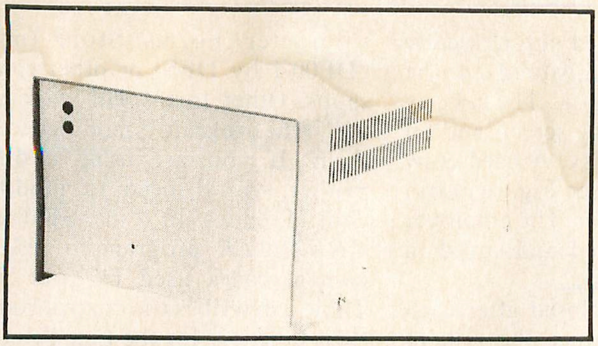

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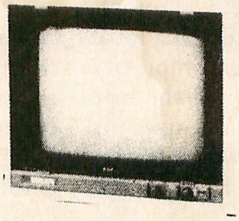

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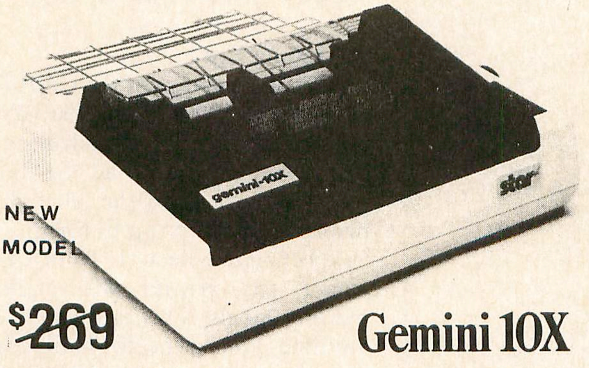

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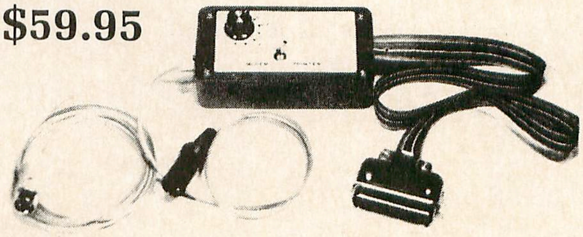

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After you have entered the data for all seven days, the program allows you to enter the total amount of the employee's sales. The program will compute the employee's commission (rounded to the nearest dollar) and add it to the gross pay. If your business doesn't require this function, change Line 21400 in the *COMPUTE* program to a REMark. If you pay a commission for other than sales, change this line to generate the proper prompt.

About Deductions

Deductions are computed automatically except for federal and state/local income taxes. Because of the complexity of tax laws and formulas and the rate at which tax rates change (go up), the withholding for these two taxes is entered via the keyboard using the appropriate tax tables. If you wish to use a tax formula to compute withholding, put the federal tax formula in Line 23400 and the state/local tax formula in Line 24000.

Social Security withholding is computed in Line 24100. This is the amount withheld from the employee's check. As you can see, Social Security is 6.7 percent of gross pay. If the rate changes, you can change Line 24100 to reflect the new rate.

The miscellaneous deductions (i.e., group insurance, savings plan, union dues, etc.) are computed automatically using the information stored in the employee's record on disk. The net pay is then displayed on the screen and all entries are saved on disk. A hard copy of the employee data (see Figure 2) will be printed on the printer. The employer totals will be computed and saved in the employer file on disk.

All file buffers are closed after each employee entry to reduce the risk of destroying data in the event of a program or system malfunction. This routine will continue until all employee records have been accessed and data has been entered for the pay period. After the last employee record is completed, the program will return to the main menu.

Table 2

Printer Control Codes

Code	Definition
LF$=CHR$(10)	single line feed to printer
LP$=CHR$(31)	set printer to large font
SP$=CHR$(30)	set printer to small font

Printing Paychecks

This program was written using the Line Printer VII and tractor feed paycheck forms (see sample check). These forms are available at any Computer Forms Store (product #DF00-1 by DFS) or other computer shops. Other forms will work equally well if the program is modified to accept them. If you are using a different printer, you'll need to modify the control codes in Line 6400 of the *CKWRITER* program to reflect the control codes used by your printer. Table 2 describes the control codes and their functions for the Line Printer VII.

To print the employees' paychecks, load the paycheck forms into the printer and set them to top of form. Choose the PRINT CHECKS option from the main menu if you are currently running the *PAYROLL* program or type `RUN''CKWRITER''` and ENTER.

The program will prompt you to enter a special message that you may want printed on employees' checks. This message can be two lines long and must have words split properly on the screen. Be sure to press ENTER only once since this message is treated as a single string. If no message is desired, press ENTER and sit back and relax.

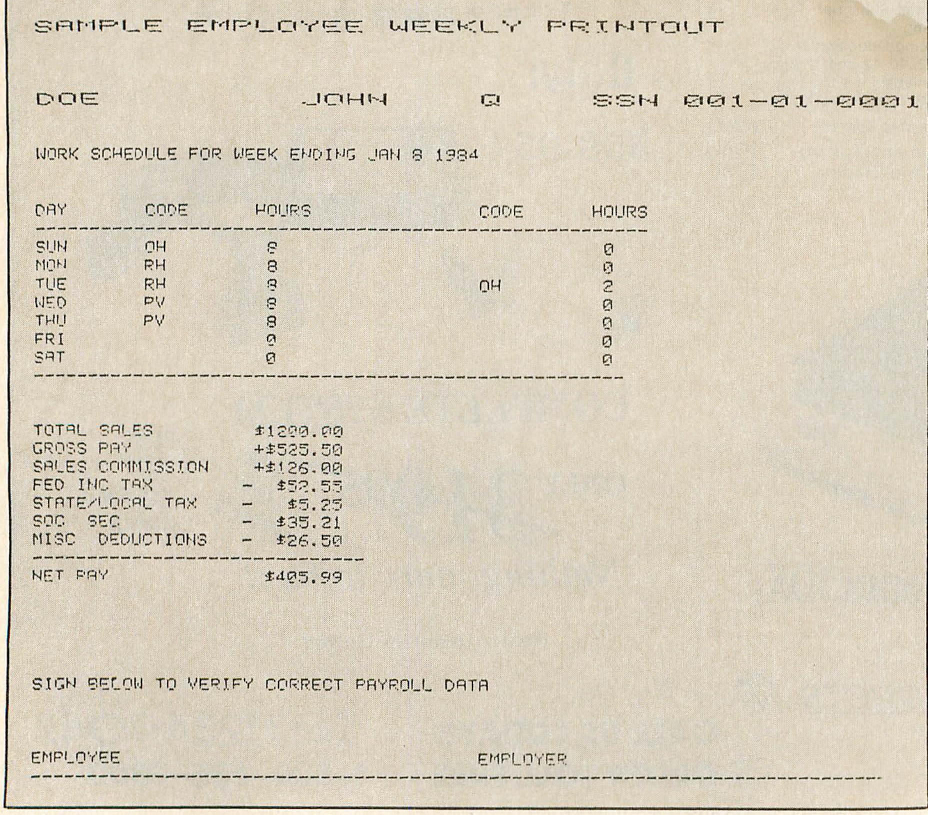
The program will access all records on disk and print a paycheck and pay stub for every employee on file. If an employee doesn't have a check due, he or she will receive a check showing $0.00 under amount. The pay stub will show all zeros for current pay period while the year-to-date totals will show the same as the previous pay stub.

A Mailing List

An added option of the *CKWRITER* program is the mailing list. You can print the names and addresses of all employees on file. Load the data disk into the drive, load the labels into the printer and set to top of form.

When you select '1' from the main menu, the printer will print your mailing labels. This is a useful option anytime you want to mail company literature to your employees' homes. The address routine was written for the Radio Shack dry gum labels. (Cat. #26-1456). You probably won't have to modify the program if you use any other label of the same size.

Figure 2



```
SAMPLE  EMPLOYEE  WEEKLY  PRINTOUT


DOE            JOHN       Q       SSN  001-01-0001

WORK SCHEDULE FOR WEEK ENDING JAN 8 1984

DAY        CODE       HOURS                  CODE       HOURS
----------------------------------------------------------------
SUN        OH           8                                 0
MON        RH           8                                 0
TUE        RH           8                    OH           2
WED        PV           8                                 0
THU        PV           8                                 0
FRI                     0                                 0
SAT                     0                                 0
--------------------------------------------------------------


TOTAL SALES            $1200.00
GROSS PAY             +$525.50
SALES COMMISSION      +$126.00
FED INC TAX          -  $52.55
STATE/LOCAL TAX      -   $5.25
SOC  SEC             -  $35.21
MISC  DEDUCTIONS     -  $26.50
--------------------------------
NET PAY                $405.99



SIGN BELOW TO VERIFY CORRECT PAYROLL DATA


EMPLOYEE                                   EMPLOYER
--------------------------------------------------------------------------------
```

Some Suggestions

It would be a good idea to run these programs parallel to your current system for several months before switching to this package completely. This will give you a chance to become thoroughly familiar with the programs and to verify all data. I have tested this program extensively for more than a year and believe it to be fully debugged. However, I cannot assume any responsibility for incorrect calculations or lost data occurring from the use of this package. If a problem arises, feel free to contact me by mail. If your problem is too technical or complicated to solve quickly, be sure to send program listings and any printouts which might help. Also send a SASE.

Improving the System

These programs can be used with any hardware or software spooler. Spooling is a method of storing data which is to be sent to the printer in a buffer until the printer is ready to accept it. It allows the computer to continue program execution while the printer is printing. If you have a slow printer, a spooler can be a real time saver.

I use the spooler written by Bill Vergona on Page 247 of the June 1983 edition of THE RAINBOW. If you have a 32K machine, you might want to try increasing the spooler size as described in the article. There are also hardware and software spoolers available through ads in THE RAINBOW and other magazines. I can assure you they're well worth the investment.

These programs were written to reduce the amount of disk activity. Some program lines appear in more than one program and unlike some programs which always load the menu from disk each time you need it, these programs have their own menu which can load any other program for you. This reduces the time required to compute your payroll as well as disk wear and tear.

All files are closed as soon as possible during program execution to reduce the risk of losing data should the system crash. However, if you get any type of BASIC error that interrupts program execution (i.e., I/O Error) be sure to close all buffers before doing anything else. This will protect the integrity of the data on disk. Always make a backup copy of the disk data and keep hard copies of all data records. Microcomputers are subject to some unpredictable results sometimes.

One other important note: This program will run perfectly on the IBM PC/XT if the `OPEN`, `CLOSE` and `FIELD` commands for reading and writing disks are modified.

As I said last month, these programs are straightforward, there are no fancy `PEEK`s or `POKE`s, so they'll work on any version CoCo with 16K or more and Disk BASIC. For those who don't want to key in the programs, send me a blank diskette, a SASE and $6, and I will send you a copy of the package. You can also get it on RAINBOW ON TAPE. If you have any questions or comments, you can write me at 14201 Marquette N.E., Albuquerque, NM 87123.

Now put that CoCo to work so you can get some rest.

3000	136	16400	113
4900	21	18300	147
6600	18	20700	10
8400	246	22400	204
9900	24	24500	104
12000	207	26500	144
14000	38	END	105

Listing 1:

```
1000 '     COMPUTE
1100 '     PAYROLL COMPUTATION
1200 '     FOR PAYROLL PACKAGE
1300 '     BY DENNIS H. WEIDE
1400 '     COPYRIGHT 1983
1500 '
1600 '
1700 CLS:FILES2,290:POKE153,10:C
LEAR1000
1800 CLS:DIMMN$(12),DA$(7),H1$(7
),H2$(7),H1(7),H2(7)
1900 DATAJANUARY,FEBRUARY,MARCH,
APRIL,MAY,JUNE,JULY,AUGUST,SEPTE
MBER,OCTOBER,NOVEMBER,DECEMBER
2000 DATASUN,MON,TUE,WED,THU,FRI
,SAT
2100 FORX=1TO12:READMN$(X):NEXTX
2200 FORX=1TO7:READDA$(X):NEXTX
2300 '
2400 '     VARIABLE TABLE
2500 '     USE REM STATEMENTS
2600 '
2700 '
2800 '          BUFFER #1-EMPLOYEE VA
RIABLES
2900 '
3000 '(A$)    12  LN$=EMPLOYEE LA
ST NAME
3100 '(B$)     8  GN$=EMPLOYEE GI
VEN NAME
3200 '(C$)     1  MI$=EMPLOYEE MI
DDLE INITIAL
3300 '(D$)    20  AD$=EMPLOYEE ST
REET ADDRESS
3400 '(E$)    12  AC$=EMPLOYEE CI
TY
3500 '(F$)     2  SA$=EMPLOYEE ST
ATE
3600 '(G$)     5  ZC$=EMPLOYEE ZI
P CODE
3700 '(H$)     9  SS$=SOCIAL SECU
RITY NUMBER
3800 '(I$)     1  DN$=NUMBER OF D
EPENDANTS
3900 '(J$)     5  HW =HOURLY WAGE
4000 '(K$)     5  UD =UNION DUES
4100 '(L$)     5  CM =COMMISSION
4200 '(M$)     5  SP =SAVINGS PLA
N
4300 '(N$)     5  GI =GROUP INSUR
ANCE
4400 '(O$)     5  CC =CHARITY CON
TRIBUTION
```

```
4500 '(P$)    1   PC$=PAYCHECK TH
IS PERIOD (Y/N)
4600 '(Q$)    5   MW =MISC. WITHH
OLDING (SAVINGS,UNION DUES,INS.,
ETC.)
4700 '(R$)    5   TS =TOTAL SALES
4800 '(S$)    5   SW =SOCIAL SECU
RITY WITHHELD
4900 '(T$)    5   FW =FEDERAL INC
OME TAX WITHHELD
5000 '(U$)    5   LW =STATE INCOM
E TAX WITHHELD
5100 '(V$)    5   SY =SOCIAL SECU
RITY Y-TO-D
5200 '(W$)    5   FY =FED. INCOME
 TAX Y-TO-D
5300 '(X$)    5   LY =STATE INCOM
E TAX Y-TO-D
5400 '(Y$)    5   CY =CHARITY Y-T
O-D
5500 '(Z$)    5   UY =UNION DUES
Y-TO-D
5600 '(A1$)   5   GY =GROUP INS.
Y-TO-D
5700 '(A2$)   5   ST =SAVINGS PLA
N TOTAL
5800 '(A3$)   5   PA =TOTAL PAID
ABSENT DAYS
5900 '(A4$)   5   PV =TOTAL PAID
VACATON DAYS USED
6000 '(A5$)   5   UA =TOTAL UNPAI
D ABSENT DAYS
6100 '(A6$)   5   VA =TOTAL VACAT
ION DAYS ALLOWED
6200 '(A7$)   5   AA =PAID ABSENT
 DAYS ALLOWED
6300 '(A8$)   5   RH =REGULAR HOU
RS
6400 '(A9$)   5   OH =OVERTIME HO
URS WORKED
6500 '(B2$)  11   WE$=WEEK ENDING
 STRING
6600 '(B3$)   5   GE =GROSS EARNI
NGS (Y-TO-D)
6700 '
6800 '
6900 '     BUFFER #2-EMPLOYER VA
RIABLES
7000 '
7100 '(D1$)     9  MO$=PAYROLL MO
NTH
7200 '(D2$)     5  PT =EMPLOYER P
AYROLL TOTAL
7300 '(D3$)     5  PY =EMPLOYER P
AYROLL Y-TO-D
7400 '(D4$)     5  T2 =EMPLOYER S
S TOTAL
7500 '(D5$)     5  YS =EMPLOYER S
S Y-TO-D
7600 '(D6$)     5  TF =EMPLOYER T
OTAL FED. INC. TAX
7700 '(D7$)     5  YF =EMPLOYER T
OTAL FED.INC. TAX Y-TO-D
7800 '(D8$)     5  TU =TOTAL UNIO
N DUES THIS PAY PERIOD
7900 '(D9$)     5  TC =TOTAL CHAR
ITY CONTRIB THIS PAY PERIOD
8000 '(E1$)     5  YC =TOTAL CHAR
ITY CONTRIB Y-TO-D
8100 '(E2$)     5  YL =TOTAL STAT
E INC. TAX Y-TO-D
8200 '(E3$)     5  TL =TOTAL STAT
E INC. TAX
8300 '(E4$)     5  IT =INSURANCE
TOTAL
8400 '(E5$)     5  IY =INSURANCE
Y-TO-D
8500 '
8600 '     CONTROL CODES
8700 '
8800 LF$=CHR$(10):LP$=CHR$(31):S
P$=CHR$(30):FP$=STRING$(32,"#"):
GOTO16900
8900 '
9000 '     SUBROUTINE TO OPEN FI
LE
9100 '
```

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FOR TELEWRITER-64®

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in memory formatting

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```
9200 OPEN"D",#1,"PAYROLL",212
9300 FIELD#1,12ASA$,8ASB$,1AS C$
,20ASD$,12ASE$,2ASF$,5ASG$,9ASH$
,1ASI$,5ASJ$,5ASK$,5ASL$,5ASM$,5
ASN$,5ASO$,1ASP$,5ASQ$,5ASR$,5AS
S$,5AST$,5ASU$,5ASV$,5ASW$,5ASX$
,5ASY$,5ASZ$,5ASA1$,5ASA2$,5ASA3
$,5ASA4$,5ASA5$,5ASA6$,5ASA7$,5A
SA8$,5ASA9$,11ASB2$,5ASB3$
9400 RETURN
9500 '
9600 '      LSET EMPLOYEE VARIABL
ES
9700 '
9800 GOSUB9300:LSETA$=LN$:LSETB$
=GN$:LSETC$=MI$
9900 LSETD$=AD$:LSETE$=AC$:LSETF
$=SA$
10000 LSETG$=ZC$:LSETH$=SS$:LSET
I$=DN$
10100 LSETJ$=MKN$(HW):LSETK$=MKN
$(UD):LSETL$=MKN$(CM)
10200 LSETM$=MKN$(SP):LSETN$=MKN
$(GI):LSETO$=MKN$(CC)
10300 LSETS$=MKN$(SW):LSETT$=MKN
$(FW):LSETU$=MKN$(LW)
10400 LSETV$=MKN$(SY):LSETW$=MKN
$(FY):LSETX$=MKN$(LY)
10500 LSETY$=MKN$(CY):LSETZ$=MKN
$(UY):LSETR$=MKN$(TS)
10600 LSETA1$=MKN$(GY):LSETA2$=M
KN$(ST):LSETP$=FC$
10700 LSETA3$=MKN$(PA):LSETA4$=M
KN$(PV):LSETA5$=MKN$(UA)
10800 LSETA6$=MKN$(VA):LSETA7$=M
KN$(AA):LSETA8$=MKN$(RH)
10900 LSETA9$=MKN$(OH):LSETB2$=W
E$:LSETQ$=MKN$(MW)
11000 LSETB3$=MKN$(GE)
11100 RETURN
11200 '
11300 '      CONVERT 5 BYTE CODED
 STRING
11400 '
11500 HW=CVN(J$):UD=CVN(K$):CM=C
VN(L$)
11600 SF=CVN(M$):GI=CVN(N$):CC=C
VN(O$)
11700 SW=CVN(S$):FW=CVN(T$):LW=C
VN(U$)
11800 SY=CVN(V$):FY=CVN(W$):LY=C
VN(X$)
11900 CY=CVN(Y$):UY=CVN(Z$):TS=C
VN(R$)
12000 GY=CVN(A1$):ST=CVN(A2$):MW
=CVN(Q$)
```

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FOR THE RADIO SHACK COLOR COMPUTER

* Runs any parallel printer from the Color Computer serial I/O port.
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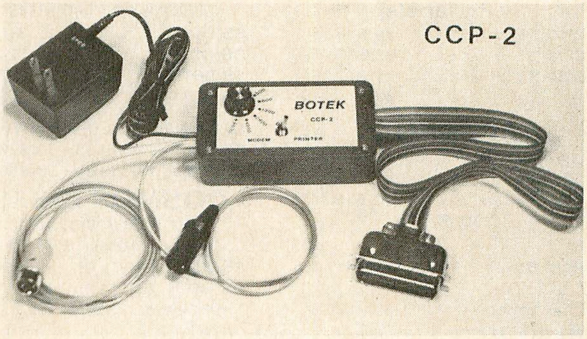

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```
12100 P1=CVN(A3$):P2=CVN(A4$):P3
=CVN(A5$)
12200 VA=CVN(A6$):AA=CVN(A7$):GE
=CVN(B3$)
12300 LN$=A$:GN$=B$:MI$=C$:AD$=D
$
12400 AC$=E$:SA$=F$:ZC$=G$:SS$=H
$
12500 DN$=I$:PC$=P$
12600 RETURN
12700 '
12800 '      SUBROUTINE TO OPEN F
ILE BUFFER
12900 '
13000 OPEN"D",#2,"EMPLOYER",74
13100 FIELD#2,9ASD1$,5ASD2$,5ASD
3$,5ASD4$,5ASD5$,5ASD6$,5ASD7$,5
ASD8$,5ASD9$,5ASE1$,5ASE2$,5ASE3
$,5ASE4$,5ASE5$
13200 RETURN
13300 '
13400 '      LSET EMPLOYER VARIAB
LES
13500 '
13600 GOSUB13100:LSETD1$=MO$:LSE
TD2$=MKN$(PT):LSETD3$=MKN$(PY)
13700 LSETD4$=MKN$(T2):LSETD5$=M
KN$(YS):LSETD6$=MKN$(TF)
13800 LSETD7$=MKN$(YF):LSETD8$=M
KN$(TU):LSETD9$=MKN$(TC)
13900 LSETE1$=MKN$(YC):LSETE2$=M
KN$(YL):LSETE3$=MKN$(TL)
14000 LSETE4$=MKN$(IT):LSETE5$=M
KN$(IY)
14100 RETURN
14200 '
14300 '      CONVERT 5 BYTE CODED
 STRING
14400 '
14500 PT=CVN(D2$):PY=CVN(D3$):T2
=CVN(D4$):YS=CVN(D5$)
14600 TF=CVN(D6$):YF=CVN(D7$):TU
=CVN(D8$)'              :TC=CVN(D9$)
14700 YC=CVN(E1$):YL=CVN(E2$):TL
=CVN(E3$):IY=CVN(E5$)
14800 MO$=D1$:M1$=D1$
14900 RETURN
15000 '
15100 '      PRINT NAME & SSN
15200 '
15300 CLS
15400 PRINTFP$;TAB(7)"ENTER PAYR
OLL DATA":PRINTFP$;
15500 PRINTLN$","GN$","MI$"."
15600 PRINT"SSN "SS$
15700 RETURN
15800 '
15900 '      ERROR ROUTINE
16000 '
16100 FOR X=1 TO 10:CLS
16200 FOR T=1 TO 50:NEXT T
16300 PRINT@233,"ILLEGAL ENTRY":
SOUND 100,1
16400 FOR Y=1 TO 50:NEXT Y,X:CLS
:RETURN
16500 RETURN
16600 '
16700 '      PROGRAM MENU
16800 '
16900 CLS:PRINTFP$;:PRINTTAB(6)"
PAYROLL COMPUTATION":PRINTFP$
17000 PRINT:PRINTTAB(10)"PROGRAM
 MENU":PRINT
17100 PRINTTAB(5)"1. COMPUTE PAY
ROLL"
17200 PRINTTAB(5)"2. EMPLOYEE DA
TA BASE"
17300 PRINTTAB(5)"3. EMPLOYER DA
TA BASE"
17400 PRINTTAB(5)"4. PRINT CHECK
S"
17500 PRINTTAB(5)"5. END PROGRAM
"
17600 PRINT:INPUT"   ENTER ONE O
F THE ABOVE";OA
17700 ON OA GOTO 18300,28500,286
00,28700,17900
```

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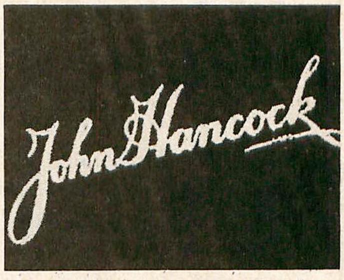

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```
17800 GOSUB16100:GOTO16900
17900 END
18000 '
18100 '      ENTER PAYROLL DATA
18200 '
18300 CLS:PRINTFP$;TAB(3)"PAYROL
L COMPUTATION PROGRAM":PRINTFP$
18400 PRINT:INPUT"PAY PERIOD DAT
E";M1$:IFM1$="NONE"THEN28400ELSE
WE$=M1$
18500 GOSUB13000:GOSUB9200
18600 FORX=1TO12:IFLEFT$(M1$,3)=
LEFT$(MN$(X),3)THENRN=X:NEXTX:EL
SENEXTX
18700 IFRN=1THEN19200
18800 INPUT"IS THIS A NEW MONTH
(Y/N)";NM$
18900 IFNM$="N"THEN19200
19000 GET#2,RN-1
19100 GOSUB14500:Z1=PY:Z2=YS:Z3=
YF:Z4=YC:Z5=YL
19200 GET#2,RN
19300 GOSUB14500
19400 FORX=1TO10:GET#1,X:CLS:IFL
EFT$(A$,7)="NO NAME"THEN28200
19500 GOSUB11500:UA=0:PA=0:PV=0
19600 L1=0:L2=0:FORQ=1TO12
19700 IFL1>1THEN19900
19800 IFMID$(A$,Q,1)=" "THENL1=Q
19900 IFL2>1THEN20100
20000 IFMID$(B$,Q,1)=" "THENL2=Q
20100 NEXTQ
20200 A$=LEFT$(A$,L1):B$=LEFT$(B
$,L2)
20300 GOSUB15300
20400 INPUT"PAYCHECK THIS PERIOD
 (Y/N)";PC$
20500 IFPC$="N"THENRH=0:OH=0:MW=
0:TS=0:SW=0:FW=0:LW=0:PA=P1:PV=P
2:P3=UA:GOSUB9800:PUT#1,X:GOTO28
200
20600 T1=270:PRINTTAB(6)"ENTER P
AYROLL CODES"
20700 PRINT:FORQ=1TO7:PRINTTAB(5
)DA$(Q):NEXTQ
20800 PA=0:UA=0:PV=0:RH=0:OH=0
20900 FORQ=1TO7:PRINT@T1,"";:INP
UTCP$
21000 IFCP$=""THENG1$="":G2$="":
GOTO21400
21100 L=LEN(CP$):FORZ=1TOL
21200 IFMID$(CP$,Z,1)="/"THENG1$
=LEFT$(CP$,Z-1):G2$=RIGHT$(CP$,L
-Z)
21300 NEXTZ
21400 H1$(Q)=G1$:H2$(Q)=G2$:H1(Q
)=VAL(G1$):H2(Q)=VAL(G2$)
21500 T1=T1+32:NEXTQ
21600 GOSUB15300
21700 PRINT:INPUT"TOTAL SALES";T
S
21800 FORQ=1TO7:H1$(Q)=RIGHT$(H1
$(Q),2):H2$(Q)=RIGHT$(H2$(Q),2)
21900 IFH1$(Q)="PA"THENPA=PA+H1(
Q):RH=RH+H1(Q)
22000 IFH1$(Q)="UA"THENUA=UA+H1(
Q)
22100 IFH1$(Q)="PV"THENPV=PV+H1(
Q):RH=RH+H1(Q)
22200 IFH1$(Q)="RH"THENRH=RH+H1(
Q)
22300 IFH1$(Q)="OH"THENOH=OH+H1(
Q)
22400 IFH1$(Q)="HX"THENRH=RH+8
22500 IFH1$(Q)="HW"THENRH=RH+8:O
H=OH+H1(Q)
22600 IFH2$(Q)="PA"THENPA=PA+H2(
Q):RH=RH+H2(Q)
22700 IFH2$(Q)="UA"THENUA=UA+H2(
Q)
22800 IFH2$(Q)="PV"THENPV=PV+H2(
Q):RH=RH+H2(Q)
22900 IFH2$(Q)="RH"THENRH=RH+H2(
Q)
23000 IFH2$(Q)="OH"THENOH=OH+H2(
Q)
23100 IFH2$(Q)="HX"THENRH=RH+8
23200 IFH2$(Q)="HW"THENRH=RH+8:O
H=OH+H2(Q)
23300 NEXTQ
23400 UA=UA/8+P3:PA=PA/8+P1:PV=P
V/8+P2
23500 '
23600 '      COMPUTE GROSS PAY
23700 '
23800 GP=RH*HW+OH*1.5*HW+TS*CM:G
E=GE+GP
23900 MW=UD+SP+GI+CC
24000 PRINTUSING"GROSS PAY THIS
PERIOD $$####.##";GP:NP=GP
24100 PRINT"NUMBER OF DEPENDANTS
 ="DN$
24200 INPUT"FED.INC.TAX";FW:NP=N
P-FW
24300 INPUT"ENTER ST/LOC TAX";LW
:NP=NP-LW
24400 SW=GP*.067
24500 PRINTUSING"SOC SEC WITHHEL
D $$###.##";SW:NP=NP-SW
24600 PRINTUSING"MISC DEDUCTIONS
 $$###.##";MW:NP=NP-MW
24700 PRINT:PRINTUSING"NET PAY T
HIS PERIOD $$####.##";NP
24800 SY=SY+SW:FY=FY+FW:LY=LY+LW
:CY=CY+CC
24900 UY=UY+UD:GY=GY+GI:ST=ST+SP
25000 GOSUB9800:PUT#1,X
25100
```

```
25200 '      ADD EMPLOYEE-EMPLOYE
R TOTALS
25300 '
25400 PY=PY+Z1+GP:YS=YS+Z2+SW:YF
=YF+Z3+FW:YC=YC+Z4+CC:YL=YL+Z5+L
W
25500 Z1=0:Z2=0:Z3=0:Z4=0:Z5=0
25600 PT=PT+GP:T2=T2+SW:TF=TF+FW
:TU=TU+UD
25700 TC=TC+CC:TL=TL+LW:IT=IT+GI
:IY=IY+GI
25800 '
25900 '      HARDCOPY OF INPUT
26000 '
26100 PRINT#-2,LP$;LN$;GN$;MI$"
   SSN "LEFT$(SS$,3)"-"MID$(SS$,
4,2)"-"RIGHT$(SS$,4);SP$;LF$
26200 PRINT#-2,"WORK SCHEDULE FO
R WEEK ENDING "WE$;LF$;LF$
26300 PRINT#-2,"DAY","CODE","HOU
RS",,"CODE","HOURS"
26400 PRINT#-2,STRING$(55,"-")
26500 FORHC=1TO7:PRINT#-2,DA$(HC
),H1$(HC),H1(HC),,H2$(HC),H2(HC)
:NEXTHC
26600 PRINT#-2,STRING$(53,"-");L
F$;LF$
26700 PRINT#-2,USING"TOTAL SALES
      $$######.##";TS
26800 PRINT#-2,USING"GROSS PAY
      +$$#####.##";GP
26900 PRINT#-2,USING"SALES COMMI
SSION +$$######.##";TS*CM
27000 PRINT#-2,USING"FED INC TAX
       -$$####.##";FW
27100 PRINT#-2,USING"STATE/LOCAL
 TAX     -$$####.##";LW
27200 PRINT#-2,USING"SOC. SEC.
       -$$####.##";SW
27300 PRINT#-2,USING"MISC. DEDUC
TIONS    -$$####.##";MW
27400 PRINT#-2,STRING$(30,"-")
27500 PRINT#-2,USING"NET PAY
      $$#####.##";NP
27600 PRINT#-2,STRING$(10,10)
27700 PRINT#-2,"SIGN BELOW TO VE
RIFY CORRECT PAYROLL DATA"
27800 PRINT#-2,LF$;LF$
27900 PRINT#-2,"EMPLOYEE";TAB(40
)"EMPLOYER"
28000 PRINT#-2,STRING$(80,"-")
28100 PRINT#-2,STRING$(21,10)
28200 NEXTX:CLOSE#1:GOSUB13600
28300 PUT#2,RN
28400 CLOSE#2:POKE153,16:GOTO169
00
28500 CLS:PRINTFP$;:PRINTTAB(8)"
ONE MOMENT PLEASE":PRINTFP$:RUN"
EMPLOYEE"
28600 CLS:PRINTFP$;:PRINTTAB(8)"
ONE MOMENT PLEASE":PRINTFP$:RUN"
EMPLOYER"
28700 CLS:PRINTFP$;:PRINTTAB(8)"
ONE MOMENT PLEASE":PRINTFP$:RUN"
CKWRITER"
```

3000	169
5700	55
8200	149
11100	41
13700	71
15400	44
END	145

Listing 2:

```
1000 '      CKWRITER
1100 '      CHECK WRITER
1200 '      FOR PAYROLL PACKAGE
1300 '      BY DENNIS H. WEIDE
1400 '      (C) 1983
1500 '
1600 CLS:CLEAR500
1700 '
1800 '     VARIABLE TABLE
1900 '     USE REM STATEMENTS
```

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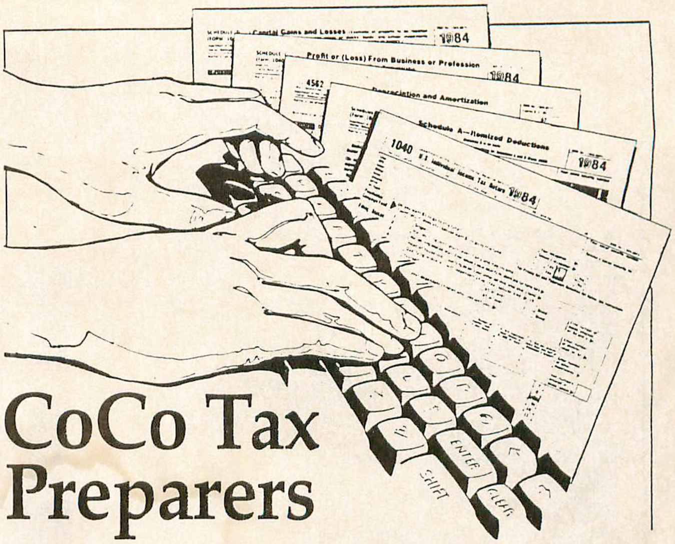
```
2000 '
2100 '
2200 '       BUFFER #1-EMPLOYEE VA
RIABLES
2300 '
2400 '(A$)    12  LN$=EMPLOYEE LA
ST NAME
2500 '(B$)     8  GN$=EMPLOYEE GI
VEN NAME
2600 '(C$)     1  MI$=EMPLOYEE MI
DDLE INITIAL
2700 '(D$)    20  AD$=EMPLOYEE ST
REET ADDRESS
2800 '(E$)    12  AC$=EMPLOYEE CI
TY
2900 '(F$)     2  SA$=EMPLOYEE ST
ATE
3000 '(G$)     5  ZC$=EMPLOYEE ZI
P CODE
3100 '(H$)     9  SS$=SOCIAL SECU
RITY NUMBER
3200 '(I$)     1  DN$=NUMBER OF D
EPENDANTS
3300 '(J$)     5  HW =HOURLY WAGE
3400 '(K$)     5  UD =UNION DUES
3500 '(L$)     5  CM =COMMISSION
3600 '(M$)     5  SP =SAVINGS PLA
N
3700 '(N$)     5  GI =GROUP INSUR
ANCE
3800 '(O$)     5  CC =CHARITY CON
TRIBUTION
3900 '(P$)     1  PC$=PAYCHECK TH
IS PERIOD (Y/N)
4000 '(Q$)     5  MW =MISC. WITHH
OLDING (SAVINGS,UNION DUES,INS.,
ETC.)
4100 '(R$)     5  TS =TOTAL SALES
4200 '(S$)     5  SW =SOCIAL SECU
RITY WITHHELD
4300 '(T$)     5  FW =FEDERAL INC
OME TAX WITHHELD
4400 '(U$)     5  LW =STATE INCOM
E TAX WITHHELD
4500 '(V$)     5  SY =SOCIAL SECU
RITY Y-TO-D
4600 '(W$)     5  FY =FED. INCOME
 TAX Y-TO-D
4700 '(X$)     5  LY =STATE INCOM
E TAX Y-TO-D
4800 '(Y$)     5  CY =CHARITY Y-T
O-D
4900 '(Z$)     5  UY =UNION DUES
Y-TO-D
5000 '(A1$)    5  GY =GROUP INS.
Y-TO-D
5100 '(A2$)    5  ST =SAVINGS PLA
N TOTAL
5200 '(A3$)    5  PA =TOTAL PAID
```

```
ABSENT DAYS
5300 '(A4$)    5  PV =TOTAL PAID
VACATON DAYS USED
5400 '(A5$)    5  UA =TOTAL UNPAI
D ABSENT DAYS
5500 '(A6$)    5  VA =TOTAL VACAT
ION DAYS ALLOWED
5600 '(A7$)    5  AA =PAID ABSENT
 DAYS ALLOWED
5700 '(A8$)    5  RH =REGULAR HOU
RS
5800 '(A9$)    5  OH =OVERTIME HO
URS WORKED
5900 '(B2$)   11  WE$=WEEK ENDING
 STRING
6000 '
6100 '
6200 '      CONTROL CODES
6300 '
6400 LF$=CHR$(10):LP$=CHR$(31):S
P$=CHR$(30):FP$=STRING$(32,"#"):
GOTO9600
6500 '
6600 '      SUBROUTINE TO OPEN FI
LE
6700 '
6800 OPEN"D",#1,"PAYROLL",212
6900 FIELD#1,12ASA$,8ASB$,1AS C$
,20ASD$,12ASE$,2ASF$,5ASG$,9ASH$
,1ASI$,5ASJ$,5ASK$,5ASL$,5ASM$,5
ASN$,5ASO$,1ASP$,5ASQ$,5ASR$,5AS
S$,5AST$,5ASU$,5ASV$,5ASW$,5ASX$
,5ASY$,5ASZ$,5ASA1$,5ASA2$,5ASA3
$,5ASA4$,5ASA5$,5ASA6$,5ASA7$,5A
SA8$,5ASA9$,11ASB2$,5ASB3$
7000 RETURN
7100 '
7200 '      CONVERT 5 BYTE CODED
STRING
7300 '
7400 HW=CVN(J$):UD=CVN(K$):CM=CV
N(L$)
7500 SP=CVN(M$):GI=CVN(N$):CC=CV
N(O$)
7600 SW=CVN(S$):FW=CVN(T$):LW=CV
N(U$)
7700 SY=CVN(V$):FY=CVN(W$):LY=CV
N(X$)
7800 CY=CVN(Y$):UY=CVN(Z$):TS=CV
N(R$)
7900 GY=CVN(A1$):ST=CVN(A2$):MW=
CVN(Q$)
8000 P1=CVN(A3$):P2=CVN(A4$):P3=
CVN(A5$)
8100 VA=CVN(A6$):AA=CVN(A7$):RH=
CVN(A8$):OH=CVN(A9$)
8200 LN$=A$:GN$=B$:MI$=C$:AD$=D$
8300 AC$=E$:SA$=F$:ZC$=G$:SS$=H$
8400 DN$=I$:WE$=B2$
```



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```
8500 RETURN
8600 '
8700 '      ERROR ROUTINE
8800 '
8900 FOR X=1 TO 10:CLS
9000 FOR T=1 TO 50:NEXT T
9100 PRINT@233,"ILLEGAL ENTRY":S
OUND 100,1
9200 FOR Y=1 TO 50:NEXT Y,X:CLS:
RETURN
9300 '
9400 '      PROGRAM MENU
9500 '
9600 CLS:PRINTFP$;:PRINTTAB(6)"P
AYROLL CHECK WRITER":PRINTFP$
9700 PRINTTAB(10)"PROGRAM MENU":
PRINT
9800 PRINTTAB(4)"1. PRINT ADDRES
S LABELS"
9900 PRINTTAB(4)"2. PRINT PAY CH
ECKS"
10000 PRINTTAB(4)"3. EMPLOYEE DA
TA BASE"
10100 PRINTTAB(4)"4. EMPLOYER DA
TA BASE"
10200 PRINTTAB(4)"5. COMPUTE PAY
ROLL"
10300 PRINTTAB(4)"6. END PROGRAM
"
10400 PRINT:INPUT"   ENTER ONE O
F THE ABOVE";OA
10500 ON OA GOTO11100,13000,1780
0,17900,18000,10700
10600 GOSUB8900:GOTO9600
10700 END
10800 '
10900 '      PRINT MAILING LABELS
11000 '
11100 CLS:PRINTFP$;:PRINTTAB(4)"
PRINTING MAILING LABELS":PRINTFP
$:GOSUB6800
11200 FORX=1TO10STEP2:Q1=0:Q2=0
11300 GET#1,X:IFLEFT$(A$,7)="NO
NAME"THENQ1=1:GOTO11800
11400 GOSUB17300
11500 A1$=NA$:B1$=NB$:C1$=C$
11600 D1$=D$:E1$=E$:F1$=F$
11700 G1$=G$
11800 GET#1,X+1:IFLEFT$(A$,7)="N
O NAME"THENQ2=1:GOTO12000
11900 GOSUB17300
12000 IFQ1=1ANDQ2=1THEN12600
12100 PRINT#-2
12200 PRINT#-2,TAB(3)B1$;C1$" "A
1$;TAB(45)NB$;C$" "NA$
12300 PRINT#-2,TAB(3)D1$;TAB(45)
D$
12400 PRINT#-2,TAB(3)E1$","F1$"
 "G1$;TAB(45)E$","F$"  "G$
```

```
12500 PRINT#-2:PRINT#-2
12600 NEXTX:CLOSE#1:GOTO9600
12700 '
12800 '      WRITE EMPLOYEE CHECK
S
12900 '
13000 CLS:INPUT"ENTER PAYDAY DAT
E";PD$:PRINT"ENTER SPECIAL MESSA
GE(2 LINES)":LINEINPUTSM$:CLS:PR
INTFP$;:PRINTTAB(6)"PRINTING PAY
CHECKS":PRINTFP$:GOSUB6800:FORX=
1TO10:GET#1,X:GOSUB7400
13100 IFLEFT$(A$,7)="NO NAME"THE
N16900
13200 IFP$="N"THENRH=0:OH=0:TS=0
:MW=0:FW=0:LW=0:SW=0:UD=0
13300 PRINT#-2,STRING$(3,10)
13400 PRINT#-2,RH;TAB(8)OH;TAB(1
2)"";
13500 PRINT#-2,USING"$$##.##";HW
;:PRINT#-2,TAB(18)"";
13600 PRINT#-2,USING"$$####.##";
RH*HW;:PRINT#-2,TAB(27)"";
13700 PRINT#-2,USING"$$####.##";
OH*1.5*HW;:PRINT#-2,TAB(38)"";
13800 PRINT#-2,USING"#####";TS;:
PRINT#-2,TAB(44)"";
13900 PRINT#-2,USING"##.#";CM*10
0;:PRINT#-2,"%";:PRINT#-2,TAB(51
)"";
14000 PRINT#-2,USING"$$#####";CM
*TS;
14100 GP=(RH*HW)+(OH*1.5*HW)+(TS
*CM)
14200 PRINT#-2,USING"$$####.##";
GP;:PRINT#-2,TAB(70)WE$
14300 PRINT#-2:PRINT#-2,TAB(70)"
";:PRINT#-2,USING"$$####.##";GP
14400 PRINT#-2,LF$:PRINT#-2,TAB(
32)"UNION";
14500 PRINT#-2,TAB(41)"SAVINGS";
TAB(51)"GR.INS.";TAB(61)"CHARITY
"
14600 PRINT#-2,USING"$$###.##";S
W;:PRINT#-2,TAB(10)"";
14700 PRINT#-2,USING"$$###.##";F
W;:PRINT#-2,TAB(20)"";
14800 PRINT#-2,USING"$$###.##";L
W;
14900 PRINT#-2,TAB(31)"";:PRINT#
-2,USING"$$##.##";UD;
15000 PRINT#-2,TAB(39)"";:PRINT#
-2,USING"$$###.##";SP;
15100 PRINT#-2,TAB(51)"";:PRINT#
-2,USING"$$##.##";GI;
15200 PRINT#-2,TAB(61)"";:PRINT#
-2,USING"$$##.##";CC
15300 PRINT#-2
15400 YD$="Y-TO-D":PRINT#-2,TAB(
2)YD$;TAB(12)YD$;TAB(22)YD$;TAB(
32)YD$;TAB(42)YD$;TAB(52)YD$;TAB
(62)YD$
15500 PU$="$$####.## "
15600 PRINT#-2,USINGPU$;SY;FY;LY
;UY;ST;GY;CY;MW+SW+FW+LW
15700 PRINT#-2,LF$:GOSUB17300
15800 PRINT#-2,NB$;C$" ";NA$;TAB
(35)LEFT$(SM$,32)
15900 PRINT#-2,LEFT$(SS$,3);"-";
MID$(SS$,4,2);"-"RIGHT$(SS$,4);
16000 PRINT#-2,TAB(35)MID$(SM$,3
3,32);
16100 NP=GP-(MW+SW+LW+FW)
16200 PRINT#-2,TAB(70)"";:PRINT#
-2,USING"$$####.##";NP
16300 PRINT#-2,STRING$(10,10)
16400 GOSUB17300
16500 Q=0:PRINT#-2,TAB(10)NB$;C$
" ";NA$;
16600 PRINT#-2,TAB(40)PD$;TAB(67
)"";
16700 PRINT#-2,USING"$$####.##";
NP
16800 PRINT#-2,STRING$(10,10)
16900 NEXTX:CLOSE#1:GOTO9600
17000 '
17100 '      SET NAME TO USEABLE
STRING
17200 '
17300 FORQ=1TOLEN(A$):IFMID$(A$,
Q,2)="  "THENNA$=LEFT$(A$,Q):GOT
O17500
17400 NEXTQ
17500 FORQ=1TOLEN(B$):IFMID$(B$,
Q,2)="  "THENNB$=LEFT$(B$,Q):GOT
O17700
17600 NEXTQ
17700 RETURN
17800 CLS:PRINTFP$;:PRINTTAB(8)"
ONE MOMENT PLEASE":PRINTFP$:RUN"
EMPLOYEE"
17900 CLS:PRINTFP$;:PRINTTAB(8)"
ONE MOMENT PLEASE":PRINTFP$:RUN"
EMPLOYER"
18000 CLS:PRINTFP$;:PRINTTAB(8)"
ONE MOMENT PLEASE":PRINTFP$:RUN"
COMPUTE"
```

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HARDWARE PROJECT

Provide your CoCo with a 'switchable setup' that's as easy as plugging into a socket . . .

Color BASIC ROM Switcher

By Clay Howe

Early models of the CoCo, the 'C' and 'D' boards, were originally marketed with Version 1.0 of the Color BASIC ROM. When the 'E' board came on the scene, it was followed by the Version 1.1. This was an improvement for all concerned, as it allowed printer operations that were not possible with the 1.0 version, as well as modifying the way RAM was to be handled.

Then came the next board, the one with no real official designation, but referred to as the "NC," 'F,' or "285" board. It did not bring with it another Color BASIC ROM version, but within a matter of months Version 1.2 was introduced in the new CoCo 2 model. This time, a problem did appear for those who were using software that was written for the previous models — not all software, but quite a large segment of the more popular machine language word processing, database and utility programs. It seems that the keyboard was being polled in a different way for one thing, plus other changes that created other problems. We're not concerned with the cause of the problems, but rather with a cure.

As an 'F' board owner, which had the 1.1 Color BASIC, I had a fairly large group of utilities, on disk and cassette, that would not work correctly with the CoCo 2 that was purchased shortly after they were introduced. Fortunately, Tony DiStefano had an article in the December 1983 issue of RAINBOW that showed how to overcome the problems by simply "piggybacking" a 1.2 ROM with a *1.1 Version ROM*, with a couple of the pins wired through a switch, so either could be selected.

This construction article is a modification, and I feel an improvement, to Tony's switcher. The reason I say improvement is that the ROMs do not require soldering to each other. In fact, neither are soldered to anything, and they may be simply plugged into sockets to provide the switchable setup. There are seven illustrations that accompany this text, and they will be referred to

(Clay Howe is a self-taught electronic and computer hobbyist. He has developed several hardware modifications for both the CoCo and radio control systems. When he can get away from his CoCo, and weather permits, he enjoys flying RC sailplanes.)

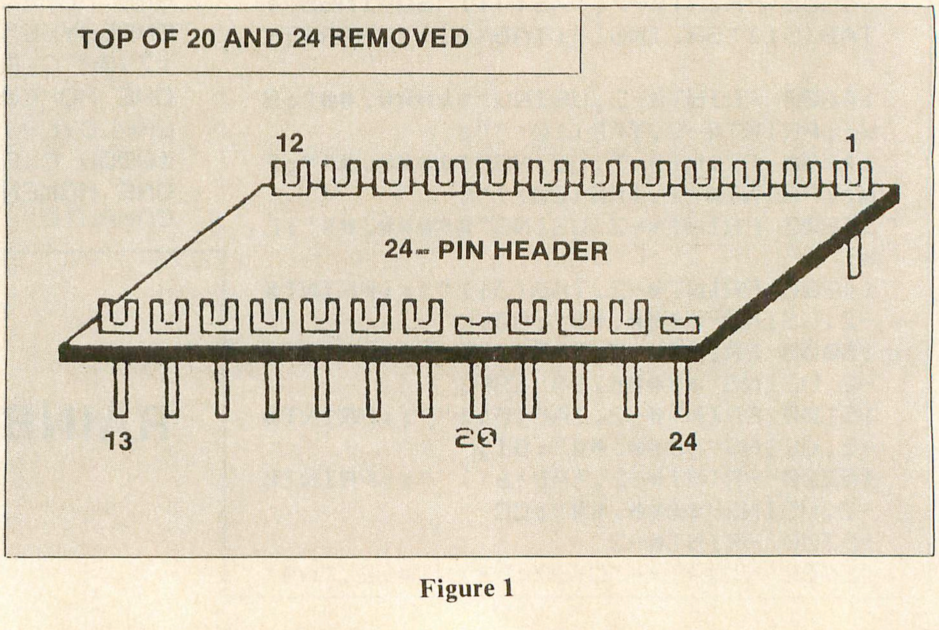


Figure 1

by number as we go through the construction process. It will be best to read the complete article, and study the illustrations, before beginning actual assembly of the switching unit.

To the best of my knowledge, the ROM Switcher will work with any board version of the CoCo. In the case of the newest "Korean" version, it will only be possible to use the switcher if the Color BASIC ROM is de-soldered from the board, and a socket put in its place.

Construction

The assembly steps that follow assume that you have some knowledge of hardware construction practices, although it should be no problem for a novice to build the ROM Switcher. If you have doubts concerning the assembly, have a "hacker" friend construct it with you — hands on experience is the best teacher, and will help prepare you for your next hardware project. The soldering should be done with a low heat iron, one with a 25 watt to 35 watt heating element is best. Don't try the project with a soldering "gun" — most of these are rated at 80 to 100 watts, and would be too hot and clumsy to work with.

Figure 1 shows a 24-pin dual inline header. You will notice that the only modifications required to the header are the removal of the top portions of the connectors at positions 20 and 24. The best way I found to remove the tops of the connectors is to insert the header into a spare 24-pin, wire-wrap IC socket, then use small nippers, like Radio Shack Cat. No. 64-1833, to snip off the tops of the two connectors. Be sure to leave a portion that looks like those in the illustration.

Figure 2 is a top view of the header. To make it possible to connect the switch to the computer's five volt bus, and the Chip Enable signal, two small wires must be soldered to the portions of the connectors left at the 20- and 24-pin positions. The wires may be fashioned from resistor lead cut-offs, bent as per the illustration, then soldered in place. Keep the header in the spare IC socket while doing this and future soldering. After the wires are soldered in place, put a small glob of fast-curing epoxy on the ends as per the figure. *Do not let the ends of the two wires touch!*

Next, you should prepare four pieces of printed circuit board as shown in Figure 3. These may be cut from any board that has the pattern of parallel holes joined by a copper trace. There

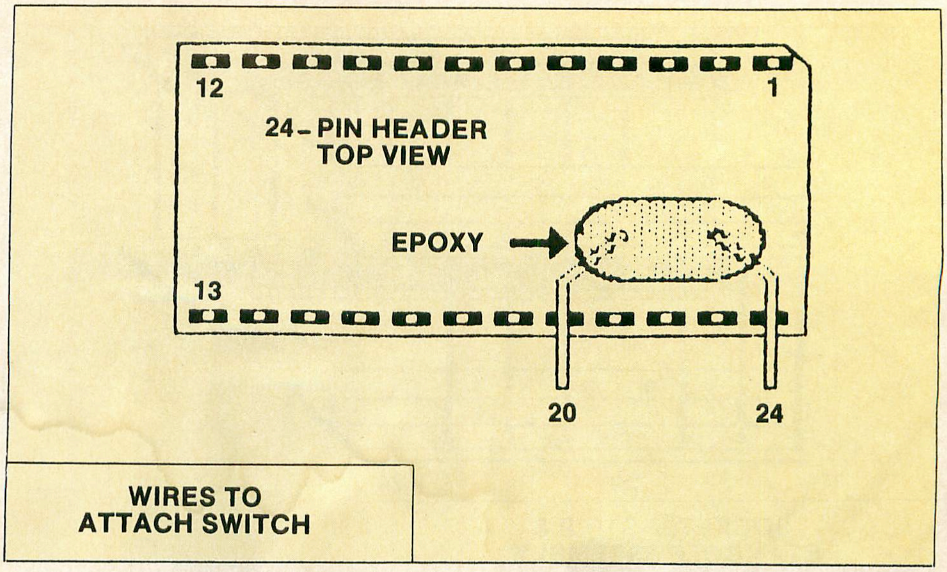


Figure 2

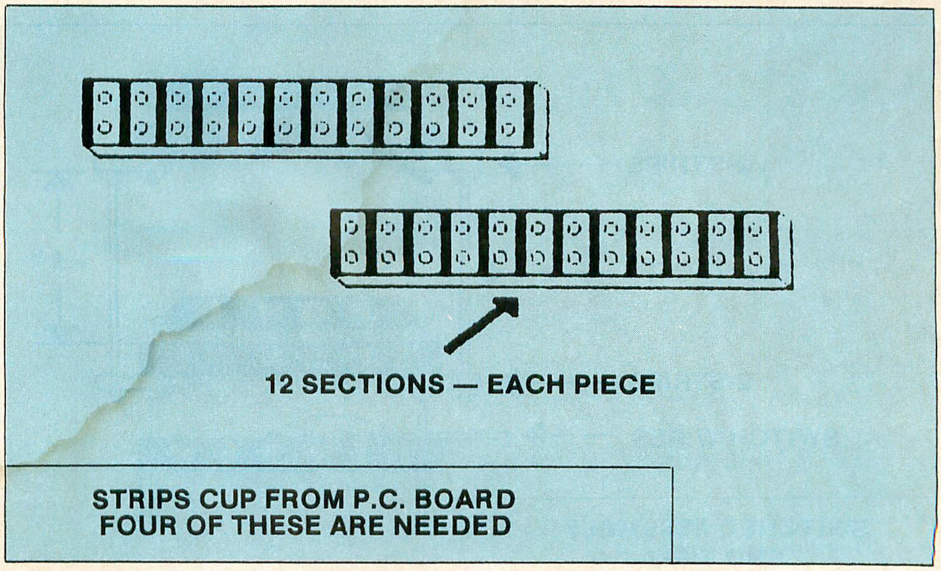


Figure 3

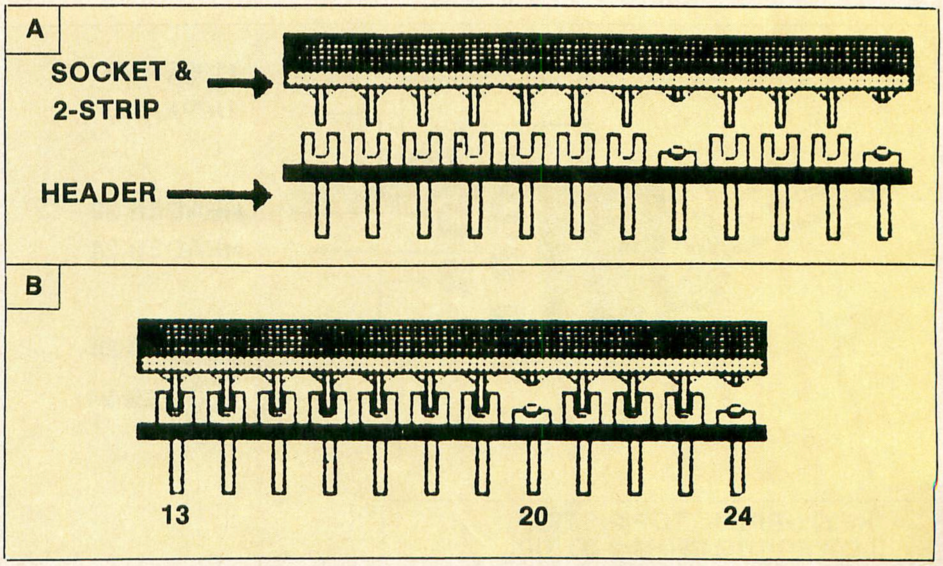


Figure 4

are several boards that are useable in the Radio Shack selection of PC boards. (Note: The four little strips of PC board will be referred to as "2-strips" in following construction steps. This is a little easier than saying "take one of the pieces of printed circuit board that has 12 sets of parallel circuit traces.")

Referring to figures 4, 5, and 6, you will see how the 2-strips are soldered to the 24-pin IC sockets. Be sure that the IC sockets are fully inserted into the strips before soldering, and that they are straight, not sloping away from the socket. Solder the four 2-strips to the IC sockets using only enough solder to make a good connection. After soldering, trim the remaining portion of the socket legs *of one socket only*, as close as possible to the underside of the 2-strip. Trim the legs on the other socket at positions 20 and 24 *only*, as in Figure 4A.

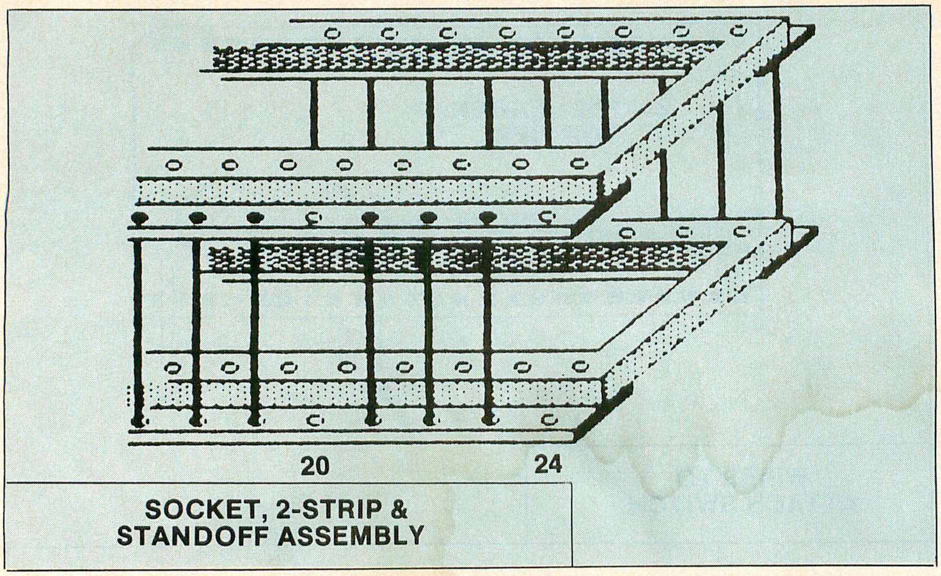
Again referring to Figure 4A, solder the socket/2-strip with the 20- and 24-position legs removed, to the top of the header. 22 pins from the socket/2-strip should be soldered, and when finished it should look like figure 4B on the side where the two legs were removed. The legs should fit right into the depressions in the header pins for soldering. The header should still be in the extra socket to keep the pins straight while the soldering is being done. The header may be fairly soft plastic, and the extra socket will act as a heat sink.

For the next step, you will need 22 pieces of small diameter wire about ¾ inch long. A good type wire to use is the cut-offs from ¼-watt resistors. If you're a hardware hacker, you probably have some from a previous project. If not, Radio Shack has spools of small bus wire. The 24 gauge (Cat. No. 278-1341) will work fine. These wires will be referred to as "standoffs" in following construction steps.

With the socket/header assembly still in the heat-sink (spare socket), solder the standoffs at all positions except 20 and 24. The standoffs are soldered into the outer holes in the 2-strip that is attached to the socket/header. Trim all standoffs as close as possible to the underside of the 2-strip. Figure 5 and the lower part of Figure 6 show where the standoffs are to be placed.

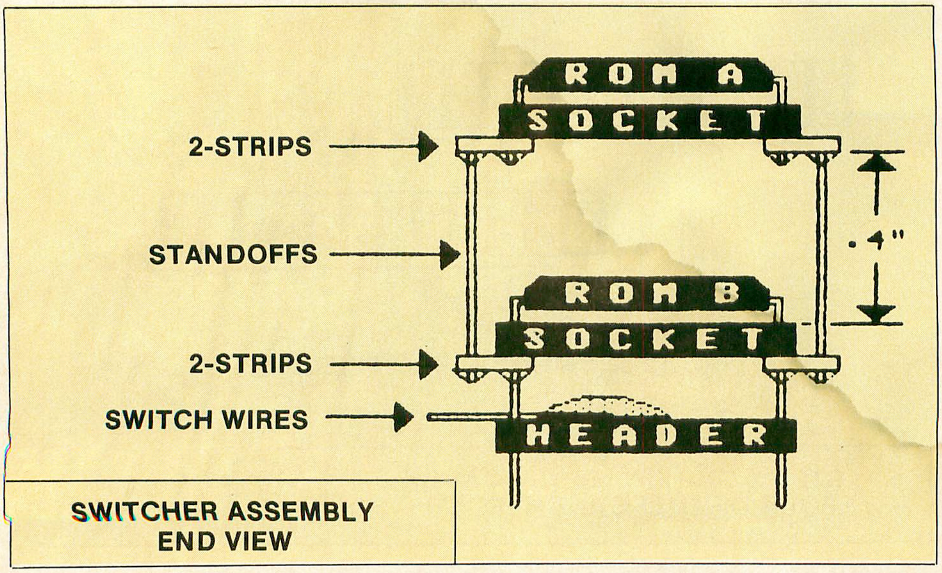
Figure 6 shows ROM 'A' and ROM 'B' plugged into the upper and lower sockets. *Do not* have ROMs plugged into the sockets during construction.

Referring to figures 5 and 6, place a spacer of some sort between the upper and lower sockets to provide a spacing



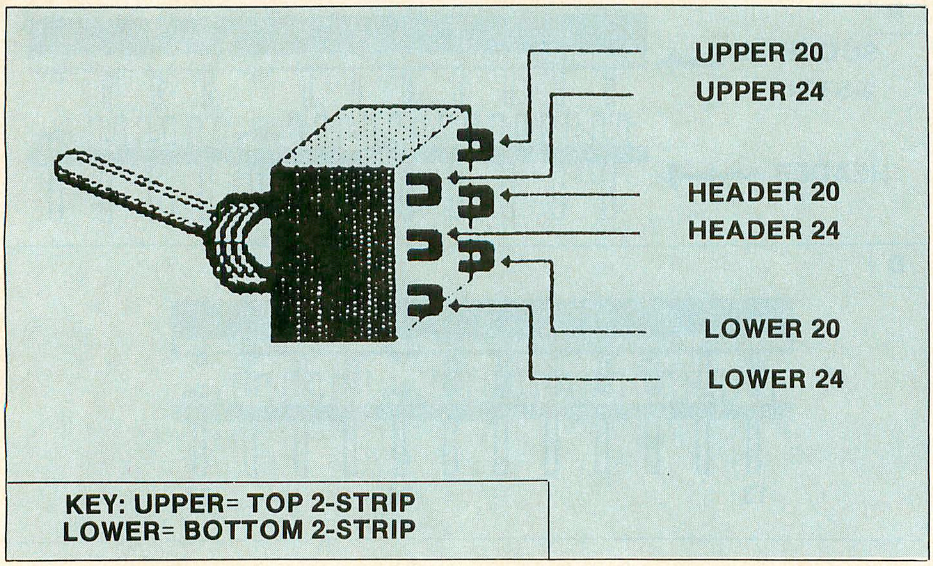
SOCKET, 2-STRIP & STANDOFF ASSEMBLY

Figure 5



SWITCHER ASSEMBLY END VIEW

Figure 6



KEY: UPPER= TOP 2-STRIP
LOWER= BOTTOM 2-STRIP

Figure 7

of no less than .4 inch. A small piece of soft wood like balsa may be easily carved to serve this purpose. Slip the standoffs that are protruding up from the socket/header assembly into the respective holes in the upper 2-strips. Again, there should be nothing at positions 20 and 24. When all are properly aligned, solder the standoffs to the bottom side of the top 2-strips, then trim the standoff wires flush with the top side of the 2-strips.

The switcher assembly should look like Figure 5, except that it will also have the header soldered to the bottom socket legs. Hold the switcher assembly up and look at the end. It will look like Figure 6.

The next step is very important. Take a magnifying glass and look the switcher over very carefully. Make sure all solder joints are well-done and none of the standoffs are touching. The first prototype of the switcher used insulated wire for the standoffs, but others, in use for several months with the bare standoff wire, have created no problems. It may be a good idea to use a flux remover at this time to clean the complete assembly. The spray-can flux remover from Radio Shack (Cat. No. 64-2324) will do a nice job. Stand the switcher on end on some paper towels, and wash it down with the flux remover.

The switch wiring is next. Figure 7 shows where the wires are to be attached. Note that one end pair will go to the upper 2-strip holes 20 and 24, the other end pair goes to the lower 2-strip holes 20 and 24, and the center pair goes to the two wires soldered and epoxied to the header. Be sure that all three wires on one side of the three pair of switch connections go to position 20 and the others to 24. *Do not accidentally cross the wires.*

The length of the switch wires depends on which model CoCo you have, and where you want to mount the switch. Allow enough wire to do the installation, but don't have unneeded wire looped around inside the CoCo. On the CoCo 2, a good place to mount the switch is the cavity under the ROM pack port. It will be easy to get to for switching, but out of the way to prevent accidents. Almost any small insulated wires may be used from the switch to the switcher. A good selection would be colored flat multi-conductor, with a different color to each connection, and all wires kept as a strip with about 1 inch of each end separated for soldering.

Once the switcher is assembled, and you begin the switch installation, be very careful while working inside the CoCo. When the switch is mounted, the Color BASIC ROMs may be inserted into the two sockets. It makes no real difference which one goes where, although I keep the most used ROM in the bottom socket. The top ROM may then be easily removed for use in one of my other CoCos if desired. The ROMs may be plugged into the sockets before or after the switcher is plugged into the board. It is easier to insert them with the switcher out, as it may be positioned away from the board clutter. *Be certain the ROMs are inserted with the notch at the correct end.* If they are plugged in backwards, it will damage the ROMs, and possibly the CoCo.

If the switch should get bumped from one position to the other, it should not hurt anything physically, but the CPU and SAM chips will "get confused," and whatever is in RAM may be either lost, or unuseable.

Although you may wish to turn the CoCo off, then flip the switch, then turn the CoCo back on again to go from one ROM version to another, the method I have used for almost a year, with no unusual results is:

1) Hold the Reset button in
2) Flip the switch
3) Release the Reset button
4) Type `POKE113,0:EXEC40999` ENTER

The Color BASIC ROM will be switched from one to the other. This may be verified by typing: `EXEC 41175` ENTER before and after switching to get the Color BASIC sign-on message on the screen.

Maybe the name of this unit should have been ROM Switcher, rather than Color BASIC ROM Switcher, as its use is not restricted to use with the Color BASIC ROMs. It may also be used to switch Extended BASIC ROMs 1.0 and 1.2, or a modified version of Color BASIC, or Extended BASIC, that has been programmed into a 24-pin EPROM such as the Motorola 68766. To go to extremes, if the disk controller was used with a short flat ribbon cable adapter, the ROM Switcher could be used to switch 1.0 and 1.1 versions of Disk BASIC ROMs. The cover would need to be left off the controller to do this, so the ribbon cable adapter would position the controller outside the ROM Pak port.

Parts List

1	24-Pin Header Plug	(JE)
2	24-Pin Low Profile Socket	(JE)
1	DPDT Micro-Mini Switch #275-626	(RS)
Misc. — wire, solder, epoxy, PC board.		

The 24-pin wire wrap socket, which is used as a heat sink during construction, is also available from (JE) Jameco Electronics.

The address of Jameco Electronics is: 1355 Shoreway Road, Belmont, CA 94020, phone (415) 592-8097.

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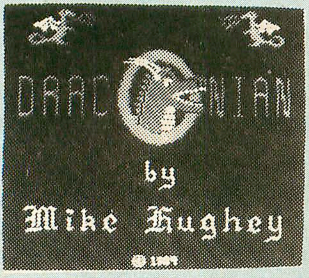

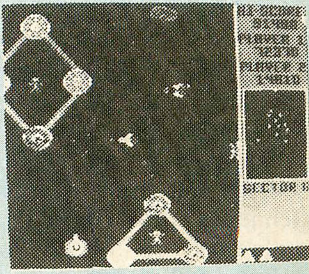

DRACONIAN

You brace yourself as your ship materializes in the enemy sector. Your engine roars to life, and you consult the long-range scanner for the position of the nearest enemy base. As you head for the base, blasting asteroids and space-mines in your path, you suddenly notice a monstrous space-dragon looming before you. Reacting quickly, you dodge his deadly fire-breath and blast him out of existence.

This is it — the single most impressive, awe-inspiring arcade game you can buy for your Color Computer. High-resolution graphics, awesome sound effects, four-voice music, and quality you have to see to believe! Experience the realism of DRACONIAN today!

JOYSTICKS REQUIRED

32K MACHINE LANGUAGE

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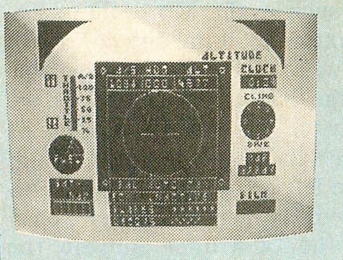

SR-71

SR-71 is a fast action game in which you are the pilot on a mission to take photographs of missile sites in Russia and deliver them to our processing laboratory in Japan. So real you will feel as if you are in the cockpit on a real spy mission. Elude Russian missiles as well as their detection devices. Another Tom Mix exclusive. A must for the adventurous. Fantastic graphics, color and sound. **32K Ext. Basic.**

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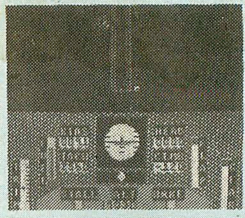
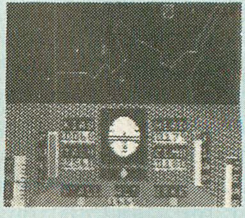
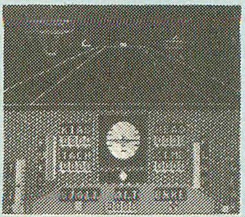




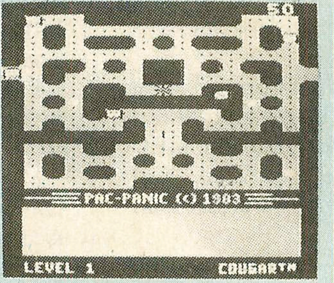


WORLDS OF FLIGHT (WOF) is a "view" oriented flight simulation for the TRS-80 Color Computer, written entirely in Machine Language. "View" oriented means that the pilot may determine his or her position by actually viewing the surrounding landmarks as opposed to using instruments which sense navigational references. This is a major departure from "instrument only" simulations which can be achieved through BASIC programs. Most instrument maneuvers and procedures may be practiced. The craft is a light-weight, single-engine airplane with low wings. A nose wheel which is both steerable and retractable is also modeled. Some aerobatics are possible including sustained inverted flight, aileron rolls, spins and stalls.

JOYSTICKS REQUIRED

32K MACHINE LANGUAGE

TAPE $29.95 DISK $32.95



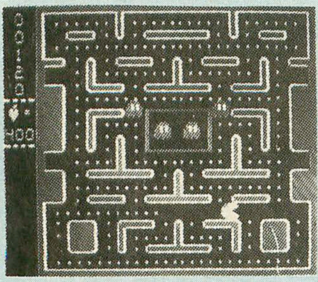
PAK-PANIC

Pakman is steered thru a maze eating dots and powerpills. Pakman is pursued by four monsters who try to catch and kill him. If Pakman eats a powerpill he becomes powerful and can eat monsters. Monsters try to avoid a powerful Pakman. As monsters are eaten their ghosts appear on the top of the screen. When seven ghosts have appeared one will fly across the screen or they will link together forming a centipede that will travel thru the maze. Pakman has no power against ghosts and centipedes and must avoid them or be killed. **JOYSTICKS REQUIRED**

32K MACHINE LANGUAGE

TAPE $24.95 DISK $27.95

BOTH MS. MAZE & PAK PANIC ONLY 44.90 TAPE, 50.90 DISK



MS. MAZE

MS. MAZE is remarkable in that it combines brilliant color, high resolution, detailed graphics, and music with a very playable game. Anything that could be done to make the Color Computer look and play like the arcade version has been done. MS. MAZE is without question the closest thing to the arcade Pac games that I have seen for the Coco.

JOYSTICKS REQUIRED

32K MACHINE LANGUAGE

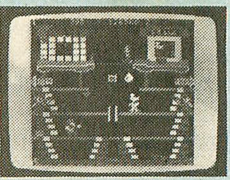
TAPE $24.95 DISK $27.95

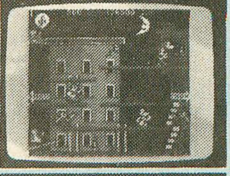
ANNOUNCING!

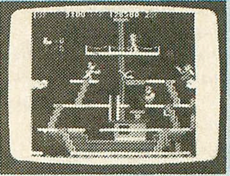
The SAILOR MAN

3 Screens-Plus "INVISO SCREEN"

The First 64K Arcade Game For the Color Computer







The first screen objective is to catch enough of Elsie's kisses (those Red Heart Shaped Things) to fill in the squares on the Sailorman's house. If you can time your punch just so, you can send the punching bag over to knock the bucket down and, with a little bit of luck, right onto **Bigfatbadguy's** head. This will give you a little (but not much) time to catch all those RHSTs.

You must avoid contact with **Bigfatbadguy** who is actively pursuing you. You must also be careful of **Olduglyseawoman** who will appear at higher difficulty levels to chuck empties at you. Either avoid the flying bottles or punch them (with the fire button) to keep from being knocked into the water.

The second screen objective is to collect enough notes to play Elsie a little love song. You may jump off and onto the other end of **Fatguyeatingahamburger's** teetertotter to fly up a deck and even two decks if you manage to catch hold of **Smartaleckkid's** grab handles. Time it right and away you go.

The Third screen objective is to collect enough letters (thrown by Elsie's cries for H-E-L-P) to complete a ladder all the way to the crow's nest where Elsie is calling you. Beware of the Crow, however, who thinks you are after her eggs!

On all screens, eating a can of **collard greens** (labeled "S" for Collard and grasped by punching the can just right) will give you amazing speed, strength and agility and allow you to send **Bigfatbadguy** into the drink with a single punch.

REQUIRES 64K

DISK $34.95 TAPE $29.95

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—As many as 300 vocabulary words and definitions may be in the computer's memory at one time.

—Words and definitions may be saved on disk or tape.

—Remarks and/or comments can be saved with word files.

—A disk loading menu allows students to load disk files without typing file names.

—Word lists may be quickly alphabetized.

—The three printer segments allow you to create and print individualized tests, puzzles, word-searches and worksheets.

—The printer segments allow full use of your printer's special features.

—The 5 game programs are based on sound educational principles and provide practice in identifying words and matching them with their definitions in a fast-paced set of activities.

TAPE $39.95 DISK $42.95

FRACTIONS - A Three Program Package - 32 K EXT. BASIC TAPE $30.95 DISK $35.95

MIXED & IMPROPER

1. Review converting mixed numerals and improper fractions.
2. Practice converting mixed numerals to improper fractions.
3. Practice converting improper fractions to mixed numerals.
4. Practice of both types. (Mixed to improper & improper to mixed)
5. Review converting mixed numerals to mixed numerals. (Used in regrouping in substraction)
6. Practice converting mixed numerals to mixed numerals.

EQUIVALENCE

1. Definitions of terms and review of finding equivalent fractions.
2. Practice finding equivalent fractions.
3. Practice finding sets of equivalent fractions.
4. Review of finding if one fraction is equal to, not equal to, less than or greater than another.
5. Practice finding if one fraction is equal to, not equal to, less than or greater than another.

LOWEST TERMS

1. Review of placing fractions into lowest terms by finding the greatest common factor (GCF) of the numerator and denominator.
2. Practice finding the GCF of pairs of numbers.
3. Practice placing fractions into lowest terms by finding the GCF of the numerator and denominator.

TEACHER'S DATABASE

TEACHER'S DATABASE is a program designed to allow a teacher to keep a computerized file of information about his/her students. There are many features that make this program particularly attractive:

- Information on as many as 100 students (or more) may be in the computer at one time.
- Each student may have as many as 20 (or more) individual items of data in his/her record.
- The program will run from cassette or disk.
- Cassette and disk files are completely compatible.
- The program is menu driven.
- Records may be easily changed, deleted, combined or added.
- Information about students may be numerical or text.
- Records may be quickly alphabetized.
- Records may be sorted by various criteria.
- Records may be reordered (ranked) based on test scores or other data.
- Data displayed during a sort may be printed on a printer or saved on disk or cassette as a new file.
- A full statistical analysis of data may be done and sent to the printer.
- Student test scores may be weighted.

REQURES 32K EXT. BASIC
TAPE $39.95 DISK $42.95

MATH DUEL

MATH DUEL is a challenging mathematics game that pits you against the computer it a game of wits. You must use all of your knowledge of factors, multiples and prime numbers to develop a strategy that allows you to gather more numbers and thus more points that than the computer.

The game is deceptively simple. You select the size of the playing field that is composed of from 8 to 100 numbers. You must then choose numbers that will give you the maximum number of points and the computer the least number of points. There are only 6 rules.

1. Any number that you chose must have at least one factor still on the playing field.
2. You receive points equal to the face value of the number that you chose.
3. The computer receives points equal to the face value of all of the remaining factors of the number that you chose.
4. All of the numbers that were awarded to you or to the computer are removed from the field.
5. The game continues until there are no numbers with factors remaining.
6. At the end the computer receives points equal to the value of all of the remaining numbers.

32K EXT. BASIC TAPE $24.95 DISK $29.95

ESTIMATE

ESTIMATE is a program designed to help children to practice estimating the answers to addition, subtraction, multiplication and division problems on the Color Computer. it has many features that make its use particularly attractive.

- Up to 5 students may use the program at the same time.
- There are 5, user modifiable, skill levels.
- The acceptable percent error may be changed as a student's skill improves.
- A timer measures the number of seconds used to answer each problem and the total time used for a series of problems.
- If a problem has been answered incorrectly, the student is told the percent error and asked to try again.
- If a problem is answered incorrectly a second time, the student is told the correct answer and the range of acceptable answers is displayed.
- A report is given at the end of each set of problems that includes the number of problems done, the number of problems answered correctly on the first try and the average percent error.
- The (BREAK) key has been disabled so that child will not inadvertently stop the program from running. **REQUIRES 16K EXT. BASIC**

TAPE $19.95 DISK $22.95

PRE-ALGEBRA I INTEGERS

INTEGERS is a series of four programs designed to give students practice in working with addition, subtraction, multiplication, division and the comparison of integers. It has many features that make a very valuable tool for introducing and/or maintaining skills.

- Up to 4 students may use the program at the same time.
- There are 9, user modifiable, skill levels.
- Students are given two opportunities to answer a problem.
- A detailed report of student performance, including number correct on first try, number wrong, total time used and percentage score, is presented at the end of a series of problems.
- The programs will run on a 16K TRS-80 Color Computer with or without disk drive.

Four distinct problem formats are presented. The first presents problems in this format: −12 + −9 = ? The second program presents a problem with missing numerals in this format: −7 − ? = 18. The third program presents a problem with a missing sign: 8 − ?6 = 14. The last program asks the student to determine the relationship (=, ◄ or ►) between two statements 3 −9 (??) −4 −5.

32K EXT. BASIC
TAPE $28.95 DISK $33.95

PRE-ALGEBRA II

The second **PRE-ALGEBRA PACK** is composed of two programs, EQUATION SOLVER AND EQUATION DUEL, that are designed to give students practice in using and solving equations. It has many features that make a very valuable tool for introducing and/or maintaining skills:

- In both programs students may choose the range of numerical values that will be included in the equations so that the difficulty may change as their skill increases.
- In EQUATION SOLVER the computer secretely generates a random equation, shows the numbers that it used in the equation and the answer and challenges the student to create his/her own equation that uses the same numbers and results in the same answer.
- In EQUATION DUEL the student and the computer race to see who will be the first to create an equation from the same set of random numbers.
- Both programs give detailed reports of the student's and the computer's performance in creating and solving equations including time used, score and percentage correct.

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Old English	Cartoon
Old English	Cartoon

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The necessities for writing your own Adventure!

The Adventure Writer's Toolkit

By Eric Tilenius

The only thing better than claiming hoards of riches and everlasting honor in an Adventure game on your computer is obtaining the honor, prestige and prizes that come with winning the Annual RAINBOW Adventure Contest. But, like solving ye ol' Adventure on the CoCo, writing one can be a difficult (but infinitely satisfying) process.

With the proper "toolkit," however, state-of-the-art Adventure writing can be a real breeze. That's what this article is all about — providing you, the creator of your own Adventure, with a wealth of tools to use in sculpting a true masterpiece.

Just like a handyman's toolkit, there are probably some tools here which you won't need. But, with all the tools I'll present you with, there will probably be one that's right for your job. To use this toolkit of Adventure-writing wealth, just look at the dark bold type at the beginning of each section of text to see the "tool" presented. Pick one up by reading the text.

If you ever thought at all about writing an Adventure, there couldn't be a better time! With these tools, and the Third Annual RAINBOW Adventure Contest to spur you on, there is absolutely *no reason not to create your very own Adventure now*!

(Eric Tilenius is a junior at Walt Whitman High School in Huntington, New York. He is currently designing a work/textbook for the school's BASIC programming course.)

> ***"With the proper tool kit . . . state-of-the-art Adventure writing can be a real breeze."***

There are many tools here: state-of-the-art graphics construction techniques, subroutines for full sentence player input, Adventure ideas, an index to past Adventure information from THE RAINBOW, how to create a winning Adventure . . . (Hey what's this? there's even "How to write an Adventure without programming!?!"). So read on and find out what the wonderful world of Adventures has in store for you.

On Your Mark, Get Set . . .

Go! "Where?" you ask. Straight to your back issues of THE RAINBOW. Here's an index of where to find a wealth of information about Adventures.

For the basics of Adventure programming, see the February, March and April 1984 issues of THE RAINBOW, Page 34, for my own tutorials on "How To Create Your Own Adventure."

Care for a utility to help you make your own Adventures? See Jorge Mir's *ADVMAKER* in the August 1982 RAINBOW, Page 47. (Also see the section in this article marked "How to create an Adventure without programming!")

Cheat at someone else's Adventure? See Dr. Keyes' "Help for the ADDICTS . . .", February 1983, Page 99.

What's a GAPAD? Well, it'll help you in your Adventure-creating, thanks to Geoff Wells. See December 1982, Page 98 and January 1983, Page 18. Also see Geoff's "Haunted House" program: February 1983, Page 64.

Captain-80. He has advice for you aspiring Adventure creators in the February 1984 RAINBOW, pages 52 and 205.

Bob Albrecht's monthly column, "GameMaster's Apprentice," might offer some help for those of you wishing to make a D&D-type game. His column started in September 1982 and runs monthly. Another column worth re-

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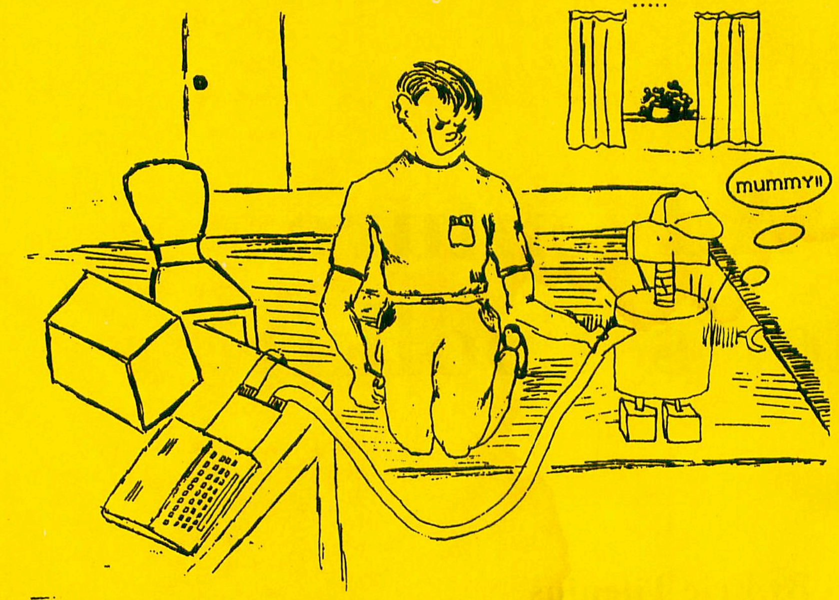

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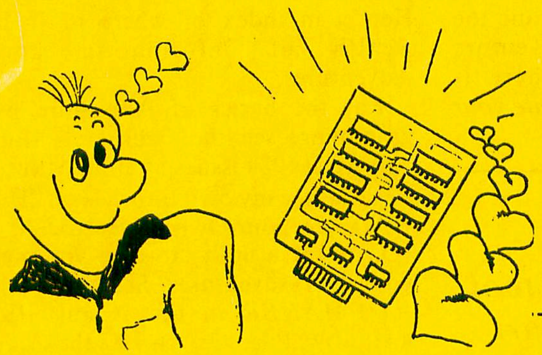

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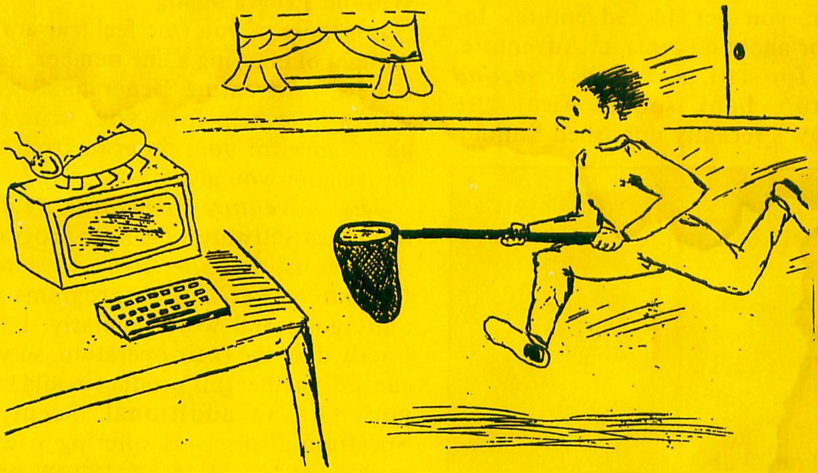

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This is only a development system. However, we anticipate the future will bring us a 7220 graphics controller and a Unix type operating system.

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viewing is Bill Nolan's "Dragon's Byte," which ran from 1982 to 1984 in THE RAINBOW.

A happy ending (graphically speaking) is provided by Morton Goldberg with "Marquee de Fin." This program, (February 1983, Page 205) adds a nice finishing touch to an Adventure.

A good way to get ideas on how to program your Adventure is to look at other people's programs. Here's a list of the Adventure programs which have been printed in THE RAINBOW:

The programs with an asterisk before the program name are Simulations which I think are also of interest. Also, be sure to check the *Rainbow Book of Adventures* (and companion tape). It's a collection of 14 winning Adventures from the RAINBOW's first Adventure contest. For the price, it's quite a bargain; you get 14 Adventures for $7.95, or about 60 cents an Adventure. (Look for THE RAINBOW's *second* Adventure book soon!) Also, THE RAINBOW's recently published Simulation book could be helpful to you as well.

Program name	**Issue date**	**Author**	**Page**
Karrak	Feb. '84	Gregory Clark	91
Sir Randolf	Jan. '83	Gregory Clark	26
Crown of Merro	Feb. '84	Jeff Craig	27
Enrak	Aug. '83	Ken Ostrer	122
Dungeon Adventure	Jan. '83	Greg Ricketts	50
*Micro Meltdown	April '83	Chris Latham	112
*Election '84	Nov. '83	Bob Tyson	74
*War Game	Nov. '83	Tom Weber	90
Arconiax Assignment	July '84	Eric Tilenius	90
The Trip	Aug. '84	Jacques Bourgeois	91
Head of the Beast	Dec. '84	Mark Nelson	90
Rescue on Alpha II	Dec. '84	Steve Mitchell	66
Lurkley Manor	March '85	Richard Ramella	42

Enough!

Well, now that you have enough reading material to last until 1986, let's explore how to use some new tools of the trade.

Without Programming

For those of you who feel fear at the thought of entering a line number, help is here. "Adventure Generators" will, with a little help from you, write the BASIC code for your program from the information you give it.

The Adventure Generator (TAG) from Jarb Software is one such program. Another is the *Spectrum Adventure Generator (SAG)*. Both programs are quite good and work similarly. I will briefly describe their operation, so you can see whether this product would help you. (As an additional incentive, Spectrum Projects is offering a cash reward on top of any RAINBOW prize if a *SAG* entry wins this year's Adventure contest.)

To start with, an Adventure Generator does not *create* the Adventure for you. You must have the Adventure all mapped out (refer to my first Adventure

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article for advice on how to map out an Adventure) and all your puzzles, objects, etc., decided before running the program. After that, the generator will ask you questions such as "What is room #1 called?", "What exits are available from this room?" and "Enter the verbs this program will recognize."

Actually, to say you don't have to know programming to utilize *TAG* or *SAG* is misleading. While strictly speaking, you don't, without elementary programming knowledge you may find yourself baffled at conditional flags (IF/THENs) and other such mysterious references the program will make.

And of course, without programming knowledge on how to add special features to the Adventure, your program will look as if it came off an assembly line. Not to worry, though. Read on about how to add graphics, etc.

The advantages of an Adventure Generator can be boiled down to this main point: It reduces the amount of programming needed and thus saves the programmer (or ambitious non-programmer) both time and work. It will spit out a basic "frame" Adventure, ready to be modified and spruced up by adding individual features and touches. Average cost: $40.

Hark! An Idea!

One of the things which will let you produce a real *winner* of an Adventure is to come up with a novel idea for the theme of the Adventure. Let's face it, folks, if you were a judge of THE RAINBOW's Adventure contest and came face to face with your three-hundred-and-forty-third dragon of the day, you'd probably call it nappy-time (unless you could find a way to make your dragon *actually* breathe fire). You wouldn't have much more of a reception with "Outer Space Adventure #4523."

The key to winning any contest is *originality*! With that in mind, I've come up with a few Adventure scenarios which could be quite captivating and fun to play. Sample them and see if any ideas pop into your head.

The World of the Small

Do we have any mechanics out there? How about an Adventure *inside* the engine of a car? A miniature player trapped inside the engine would have a carload of troubles, including oil slicks, someone starting the car, etc. Or, how about an Adventure *inside a computer* (like *TRON*).

An Adventure in one room? Jorge Mir did one, and won! (See *ONEROOM* in the *Rainbow Book of Adventures*.) This concept could be taken one step further — a character of the "incredible shrinking man" type would have a pack of trouble and provide the player with a real challenge.

Or, try a different position. Instead of the player being human, how about an ant, dog, bird, or other animal which has to compete with man?

Lights, Camera . . .

Adventure! Adventures based on movies have a great deal of potential. Unfortunately, since all movie titles and characters are copyrighted, you'll have to be careful. However, some appropriate name or idea changing and you shouldn't have any problems. Try these on for size.

Since *Ghostbusters* appeared on the silver screen, "busting" has become a popular American pastime. How about a Computerbusters? Killer IBMs and all. Or a Cabbage Patch Busters? Well, if busting makes you feel good, there should be plenty of opportunity in this category.

Here are some other movies which might lend themselves to Adventure versions: *Brainstorm, Dune, 2010, E.T., Beverly Hills Cop* (yes, an Eddie Murphy Adventure! Make sure to throw in the humor), or basically any movie you can think of.

The Real World

Rather than escaping into a dungeon, how about pitting Freddie the Fearless against a day in the office? Will he survive? Can he make it to coffee break without turning the boss into a maniac? Should he ask that secretary over there out for lunch? And, what is this mysterious note the mail clerk left him? Tune in to the Third Annual RAINBOW Adventure Contest and provide the answers yourself.

How about life in the big city? An Adventure by itself. Would Indiana Jones do as well here? Even with angry landlords, muggers, cops, punks and break dancers around every corner? You create the Adventure and see.

You Get the Idea

These are sample scenarios. I'm sure you can come up with ideas that are infinitely superior if you just think for a few minutes, "What would I have fun playing?" Then, think of anything from the most off-the-wall ideas to the most civilized. When an idea pops into your

The RAINBOW

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head, grab it — and turn it into a winning Adventure!

Where It's At

This section will discuss state-of-the-art Adventures on the CoCo. Where the "technology is at," and what can be expected from a winning Adventure. We'll look at several commercial Adventures on the CoCo, as well as past Adventure contest winners, to see what makes them so excellent. After that, I'll give you some hints to make yours just as good.

Graphics

Perhaps nothing has made a bigger hit in the world of Adventure games than the introduction of graphics Adventures. Now, finally, the player can see what he is supposed to see, rather than imagine it. Of course, it did take away some of the player's imagination, but that is the price one pays to see pretty pictures. Still, Mark Data, the first company with "memory resident" graphics Adventures, sold tons of their programs.

Upon seeing these Adventures, most prospective Adventure makers feel rather intimidated and ask, "Can I do that?" The answer is a resounding yes! One technique for creating BASIC graphics Adventures was given in my March 1984 article in THE RAINBOW. I'll present another method later on in this article, but for now, consider putting graphics in your Adventure *only if* you are good at drawing computer pictures or are artistically inclined (or have a friend who is and would help you). Nothing ruins a good text Adventure faster than crude, ugly pictures.

Interaction

A four-syllable word that is the key to any Adventure. An Adventure must interact with the player in a way that provides the player with easy control over the Adventure. Companies like Infocom, Inc., use a sophisticated *parser* that breaks down sentences into basic English elements and uses them to translate complex sentences for the computer to respond to. Such sophistication would be too slow in BASIC, but Listing 1 provides a cop-out on the parser method.

Listing 1 is a subroutine you can use in your Adventure to translate a sentence into two key words. In other words, Listing 1 allows the player of your Adventure to type in *full sentences* and the subroutine will give you the two key words of three letters each. It does this by taking the first and last words.

Simple as this trick sounds, it works 90 percent of the time. For example, `TAKE THE BIG GRIZZLY` would give you A$ as TAK (the verb) and B$ as GRI (short for GRIZZLY, the noun). Unfortunately, `MOVE THE BIG GRIZZLY ACROSS THE FLOOR` wouldn't work, but that's the price for allowing the player a little more freedom of input. For an even better routine, see the part of this article marked "Helpful Routines."

An interesting note: One of the intensely studied areas of computer application is Artificial Intelligence. This field links closely to computer Adventure games, as Prickly-Pear's *Adventure in Wonderland* illustrates. The program uses an Elisa-type Artificial Intelligence simulator to allow the player to converse with the characters of Wonderland. For example, your companion, the Cheshire Cat, might ask you, "`And how are you today?`" to which you, of course, reply, "`Fine. And you?`" (Most polite, wouldn't you agree?) The cat responds by saying, "`I thought you would say that.`"

Such dialogue really can liven up an Adventure. Is there anyone out there who would like to tackle an Adventure with dialog? Go ahead! The door is wide open.

Still on the subject of hi-tech Adventure ideas, we all know the routines in Microsoft BASIC for music on the CoCo are slightly less than state-of-the-art. However, use of appropriate (but not overuse), CoCo `PLAY` and `SOUND` statements can enhance an Adventure.

How to Cheat at Making Graphics in BASIC

If you're making a graphics Adventure, yet using BASIC for your Adventure, here's a really easy way to produce the BASIC "code" for graphics you draw on the screen. A BASIC Graphics Editor will let you draw `LINE`s, `CIRCLE`s, boxes, etc., on the screen and then produce the BASIC statements that create the picture you drew. This program can be used to *easily* draw pictures for a BASIC Adventure.

Such a program, *Chroma-Sketch*, is available from Nexus. ($35 disk, $30 cassette). *Chroma-Sketch* allows the user to draw and letter on the Hi-Res screen in 22 colors and shading. It looks like an excellent tool for graphics Adventure development.

I have a similar, stripped down program written in BASIC by Ron

Ginger. This version will be available on CompuServe (I'll upload it to the GRAPHICS/GAMES database) for anyone who wants it. Be sure to look for it and download it if you have access to CompuServe.

See my second Adventure tutorial (March 1984) for more information on designing graphics Adventures. Just remember, your graphics Adventure will have to be contained in memory, like *Trekboer* by Mark Data, rather than access the disk, like *Sands of Egypt* and *To Preserve Quandic* (Prickly-Pear).

A Package Deal

Here's the latest scoop on Adventure packaging. I mean, if you are going to go to all the satisfying work of writing and submitting your own Adventure, you don't want to submit it in left-over Saran Wrap and mail it in a paper bag. With those sage points in mind, here's a nice way to package and send in your entries to THE RAINBOW.

First, make a cover page. This should include your program's name near the center of the page, along with your name, address, phone number and the date near the bottom of the page. If you are artistic, you may want to jazz it up with artwork appropriate to your Adventure's theme. CoCo art is also good. Print it out on the title page. Keep in mind, though, that art is totally unnecessary and should be left out if you don't feel secure with your artwork or if your greatest work of art to date is a stick figure drawing of Mr. T.

After the cover page, have all the instructions for your Adventure. The cover page followed by the instruction page(s) should make a sort of "documentation booklet." Put all the necessary steps for loading, running and playing your Adventure here. Also, *point out* here what makes your Adventure so special (i.e., features, plot, originality, etc.). Include your name, address and program name on every page of this book.

At the end, have a solution sheet for the judge. A map of the Adventure would also be a good idea to include in your booklet.

Next, save your game in ASCII format to disk or cassette by typing `CSAVE''PROGRAM'',A`. Make two saves. Make sure your name and program name is on the disk or cassette as well as embedded (with `REM` statements) in the program. Put the cassette or disk between something to protect it during mailing (cardboard works well).

If you have a printer, or can get to a friend's printer, `LLIST` your program and include it, too, so the judges can look over the program easily.

Finally, put your instruction booklet, disk or cassette, and program listing all together. If you have a zip-lock bag the right size (the kind many software programs come in), you may want to put all three parts together in the same way professional software often comes: the disks and printout in the middle of the manual. In any case, place all three things in a large envelope that will accommodate everything without having to fold or bend anything.

> ***"One of the things which will let you produce a real* winner *of an Adventure is to come up with a novel idea for the theme of the Adventure."***

Address the envelope, remembering to include your return address. You want to mark the envelope with the following labels: FIRST CLASS, MAGNETIC MEDIA ENCLOSED — DO NOT BEND OR X-RAY and ADVENTURE CONTEST ENTRY ENCLOSED. Be sure to put a piece of paper inside the envelope with the words, "This software and documentation is an entry for the RAINBOW Adventure Contest submitted by ___."

Presto! All done — now just take it to the post office, get the right first class postage put on it and send it on its (winning) journey!

Helpful Subroutines

All the program listings in this article are subroutines designed to help you write a more professional Adventure. Look them over and feel free to use any you wish to. We already covered Listing 1 in the section "Where it's at." Now we'll take a look at listings 2 and 3.

Listing 2 is an enhanced version of Listing 1. Like the first program, this subroutine will allow the player to type in full sentence commands to the computer. However, it differs in many ways. Instead of giving you a three-letter abbreviation for the first and last words in the sentence, Listing 2 actually scans the whole sentence looking for matches with a *key word list*. It will then return the last verb it matched as A$ and the last noun as B$.

It also has an additional feature — it will return the "verb number" as 'A' and the "noun number" as 'B.' In other words, if you make a table representing each verb and noun as a number, you can use this in your program. For instance, if Noun Number 3 is "tiger," you could have a line in your program `IF B=3 THEN PRINT''IT EATS YOU UP!`. This way, the player can't cheat as much by looking at the listing (it would be pretty obvious if the listing said `IF B$=''TIGER'' THEN PRINT ...`) and it also uses up less memory.

To use the subroutine, make `DATA` statements with all your verbs and then `READ` your verb list into the array V$(X) (where 'X' is the verb number). Make sure to have the last verb `READ` into V$(X) be the word "`END`." Do the same for your noun list, except `READ` it into N$(X). Look at the sample `DATA` and `READ` statements in Listing 2 if you're a little confused. It will clear things up.

One of the uses for which this subroutine is ideal is dialog with characters. You could have the program check for key conversation words — Hello, How, What, etc., and then have the program reply based on the verb and noun numbers. Or, maybe you could come up with an even better use for it. In any case, it comes in handy for decoding a player's input.

Now for Listing 3! This is a nice little subroutine which will add a certain flair to any Adventure screen. Put whatever you want `PRINT`ed in the string PR$, then `GOSUB 30000`. Wow! It will not only make sure no words are ever split, but it will also put a different color frame around your text each time you use it. `RUN` the sample in Listing 3 for a demonstration.

Conclusion

Well, it's time to start writing your own imaginative Adventure. So get going and don't miss out!

Anyone wishing to contact me may do so in one of the following ways: via MCI Mail to Eric Tilenius (send it paper if you want a prompt reply) or via CompuServe (70346,16). I hope you have found "The Adventure Writer's Toolkit" helpful. Now show the world *your* best Adventure!

Listing 1:

```
10 'FULL-SENTENCE INPUT ROUTINE
20 '    BY ERIC W. TILENIUS
30 ' THE RAINBOW: APRIL '85
40 'THIS SUBROUTINE WILL ASK THE
    PLAYER FOR INPUT AND WILL
    BREAK DOWN HIS INPUT, WHICH
    CAN BE A FULL SENTENCE IN
    LENGTH INTO TWO KEY WORDS OF
    THREE LETTERS EACH.
50 'TO USE THE SUBROUTINE, JUST
    TYPE "GOSUB 20000".
60 GOSUB 20000:PRINTA$,B$:END
20000 LINEINPUT"WHAT NOW>";I$
20010 'I$=PLAYER'S INPUT
       A$=3 LETTER VERB
       B$=3 LETTER NOUN
20020 A$="":B$="":IF I$="" THEN
GOTO 20000
20030 FOR C=1 TO LEN(I$)
20040 IF MID$(I$,C,1)=" " THEN N
EXT:RETURN
20050 A$=MID$(I$,C,3)
20060 C1=C+2:IF C1>LEN(I$) THEN
RETURN
20070 C1=C:FOR C=LEN(I$) TO C1+2
 STEP -1
20080 IF MID$(I$,C,1)=" " THEN N
EXT:RETURN
20090 IF MID$(I$,C-1,1)<>" " THE
N NEXT:RETURN
20100 B$=MID$(I$,C,3):RETURN
```

Listing 2:

```
10 '**FULL SENTENCE DECODE #2**
20 '     BY ERIC W. TILENIUS
30 ' THE RAINBOW: APRIL 1985
40 'TO BE USED AS A SUBROUTINE
    FOR YOUR ADVENTURE IN  THE
    RAINBOW ADVENTURE CONTEST!
50 ''''''''''''''''''''''''''''''''
60 'THIS SUBROUTINE WILL ALLOW'
70 'THE PLAYER TO TYPE IN FULL'
80 'SENTENCES AND THIS ROUTINE'
90 'WILL SEARCH HIS INPUT  FOR'
92 'THE KEY VERBS AND  NOUNS &'
94 'WILL RETURN THEM AS A$/B$ '
96 'I$=PLAYERS INPUT          '
   'A$=VERB RETURNED          '
   'B$=NOUN RETURNED          '
   'V$(C)=PLAYER'S VERB LIST  '
   'N$(C)=PLAYER'S NOUN LIST  '
   'A=VERB NUMBER RETURNED    '
   'B=NOUN NUMBER RETURNED    '
98 ''''''''''''''''''''''''''''''''
100 REMARK-THIS IS SAMPLE DATA
110 DATA TAKE,GET,EAT,DROP,END
120 FOR C=1 TO 5:READ V$(C):NEXT
130 DATA BEAR,PEAR,CAMPER,MATCHE
S,PRINCESS,TIGER,END
140 FOR C=1 TO 7:READ N$(C):NEXT
150 REMARK--END OF DATA--
160 LINE INPUT"WHAT NOW>";I$
170 GOSUB 10000:'GO TO DECODE
ROUTINE
```

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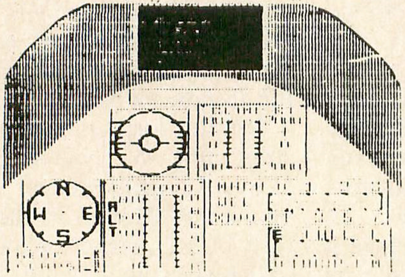

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The listing:

```
1 FORX=1TO255:PMODE4:SCREEN1,1:P
CLS:CIRCLE(60,140),50:CIRCLE(172
,140),50:DRAW"BM9,90S25R2E3R5F3R
8E3R5F3R3U7L7H6D6R5H5U1L1D6L1U4B
L1D6L2U1R2U1L9E4R5BR1U1L7G5NL6U1
H1L1U1R2U1L7F1R4L2D1NR2L1G1D1L2D
7":POKE178,X:PAINT(14,88),,5:POK
E178,1:PAINT(1,1),,5:NEXT
```

Kurt Fisher
North Platte, NE

(For this winning one-liner contest entry, the author has been sent copies of both *The Rainbow Book Of Simulations* and its companion *Rainbow Simulations Tape*.)

```
180 PRINTA$,B$,A,B
999 STOP
10000 'FULL SENTENCE DECODE.
10005 A$="":B$="":A=0:B=0:I$=I$+
" "
10010 FOR C=1 TO LEN(I$)
10020 IF MID$(I$,C,1)=" " THEN
I1$=LEFT$(I$,C-1):I$=MID$(I$,C+1
):C1=1:C2=1:GOSUB 10040:GOTO 100
10
10030 NEXT:RETURN
10040 IF I1$=V$(C1) THEN A$=I1$:
A=C1:RETURN
10050 C1=C1+1:IF V$(C1)="END" TH
EN GOTO 10060 ELSE 10040
10060 IF I1$=N$(C2) THEN B$=I1$:
B=C2:RETURN
10070 C2=C2+1:IF N$(C2)="END" TH
EN RETURN ELSE 10060
```

Listing 3:

```
5 CLEAR 500
10 'COLORFRAME SCREEN PRINT
20 '   BY ERIC W. TILENIUS
30 'FROM THE RAINBOW: APRIL '85
40 PR$="THIS IS A DEMONSTRATION
OF THE REVISED PRINT ROUTINE FOR
 ADVENTURES. THE SUBROUTINE WILL
 TAKE THE TEXT IN PR$ AND PRINT
IT OUT LIKE THIS. THE COLOR BACK
GROUND WILL CHANGE RANDOMLY. DES
IGNED BY ERIC TILENIUS. NOTICE N
O WORDS ARE BROKEN."
50 GOSUB 30000
60 PRINT@416,"YOUR COMMAND:"
70 END
30000 CX$=CHR$(32):LL=31
30010 CO=RND(8)
30020 CLS(CO)
30030 PRINT@32,;:PRINT TAB(1);
30040 IF LEN(PR$)<LL THEN 30100
30050 FOR CX=LL TO 1 STEP -1
30060 IF MID$(PR$,CX,1)=CX$ THEN
 CC=CX:GOTO 30080
30070 NEXT CX:GOTO 30100
30080 PRINT LEFT$(PR$,CC-1);:PR$
=MID$(PR$,CC+1):PRINT:PRINTTAB(1
);
30090 IF LEN(PR$)>LL THEN 30050
30100 PRINTPR$
30110 BL=143
30120 BL=BL+(16*(CO-1))
30130 FOR C=0 TO 9:PRINT@32*C,CH
R$(BL);:PRINT@32*C+31,CHR$(BL);:
NEXT
30140 RETURN
```

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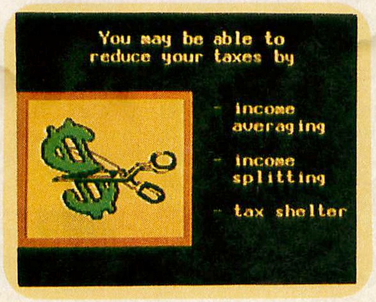
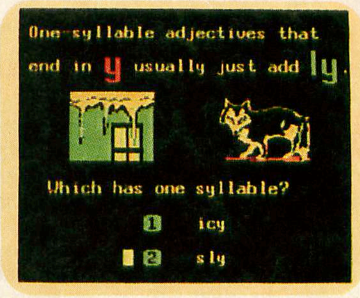


Which?
1 sister
2 smaller



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The technical editor of THE RAINBOW takes you inside your Color Computer, discussing hardware and software interfacing and explaining the differences between the various boards and disk drives. He also will answer a great variety of technical questions.

- **Wayne Day** — **Exploring CompuServe & The Color SIG**

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A regular columnist in THE RAINBOW, he will discuss electronic spreadsheets for the Color Computer: why they are practical for you and how CoCo commercial spreadsheet products compare with popular products for other computers.

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Turn Your Monitor Inside Out

By Jan Pieter Schreur

After looking at the Color Computer's standard video display with black characters on a green background for some time, I figured it would be nice if the display could be inverted, so the screen would be less tiring to look at and have the more professional appearance of a black screen with green characters.

To achieve this, I made a hardware change to my computer. It is possible, however, to get the same result with a machine language program by hooking into BASIC's print routine. But a hardware change has the advantages of not needing to load and run a program any time before you use your computer, and it will work with any program your computer is running, including ROM packs that might not even use the BASIC print routine. You just turn on the computer and you have inverted video. To keep maximum compatibility of my CoCo, I made the change switchable, so the computer can always be switched back to its original mode.

Theory of Operation

In Figure 1, you can see part of the Color Computer's schematic diagram, in which only the most important connections are shown. The heart of the CoCo's video circuitry is the MC6847 Video Display Generator (VDG). When the VDG is in the alphanumerical mode, i.e., when it is displaying readable characters, the data inputs D6 and D7 (pins 2 and 40) are not used by the VDG. The data lines D0 and D5 determine the character to be displayed by the VDG.

In the Color Computer data input, D6 is also connected to pin 32, which is the "invert" input of the VDG. When this input is held high, the VDG inverts all alphanumerical characters, so they will appear black on a green background. The Color Computer displays all its uppercase letters, numbers and symbols with D6 held high; only when lowercase characters are displayed this line is low, which results in green characters on a black background. To invert the characters displayed by the computer, it is only necessary to invert the signal going to pin 32 of the VDG.

The change I made to my CoCo is shown in Figure 2. I used an exclusive-or gate to invert or "non-invert" the signal, depending on the position of the switch. When the switch is closed, input 1 of the exclusive-or gate is pulled down (zero volts) and the output (3) follows the other input (2), so the signal on the "invert" input of the VDG equals the signal on data line D6. When the switch is open, input (1) of the exclusive-or gate is held high by the resistor and

---

(Jan Pieter Schreur studies physics at the University of Amsterdam in the Netherlands where he was introduced to computers and programming. He combines this with his hobby of electronics.)

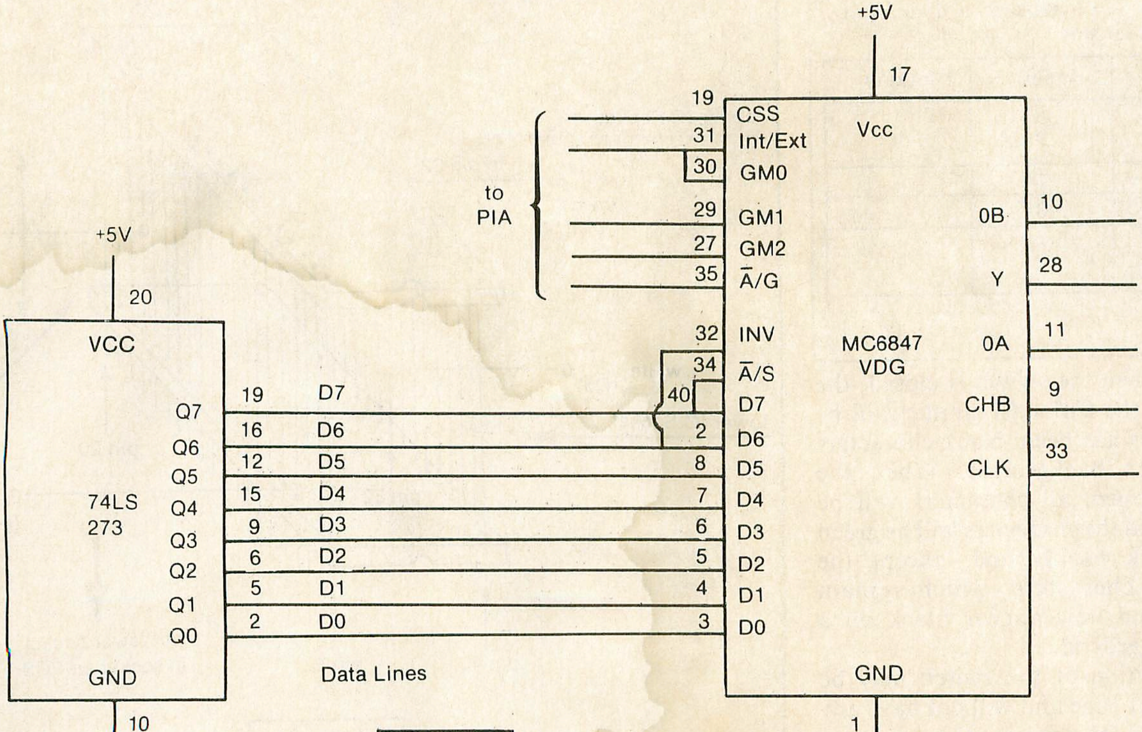
+5V
17
Vcc
19 CSS
31 Int/Ext
30 GM0
to PIA
29 GM1
27 GM2
35 A̅/G
32 INV
34 A̅/S
40 D7
2 D6
8 D5
7 D4
6 D3
5 D2
4 D1
3 D0
MC6847 VDG
0B 10
Y 28
0A 11
CHB 9
CLK 33
GND
1
+5V
20
VCC
74LS 273
Q7 19 D7
Q6 16 D6
Q5 12 D5
Q4 15 D4
Q3 9 D3
Q2 6 D2
Q1 5 D1
Q0 2 D0
GND
10
Data Lines

figure 1 original circuit

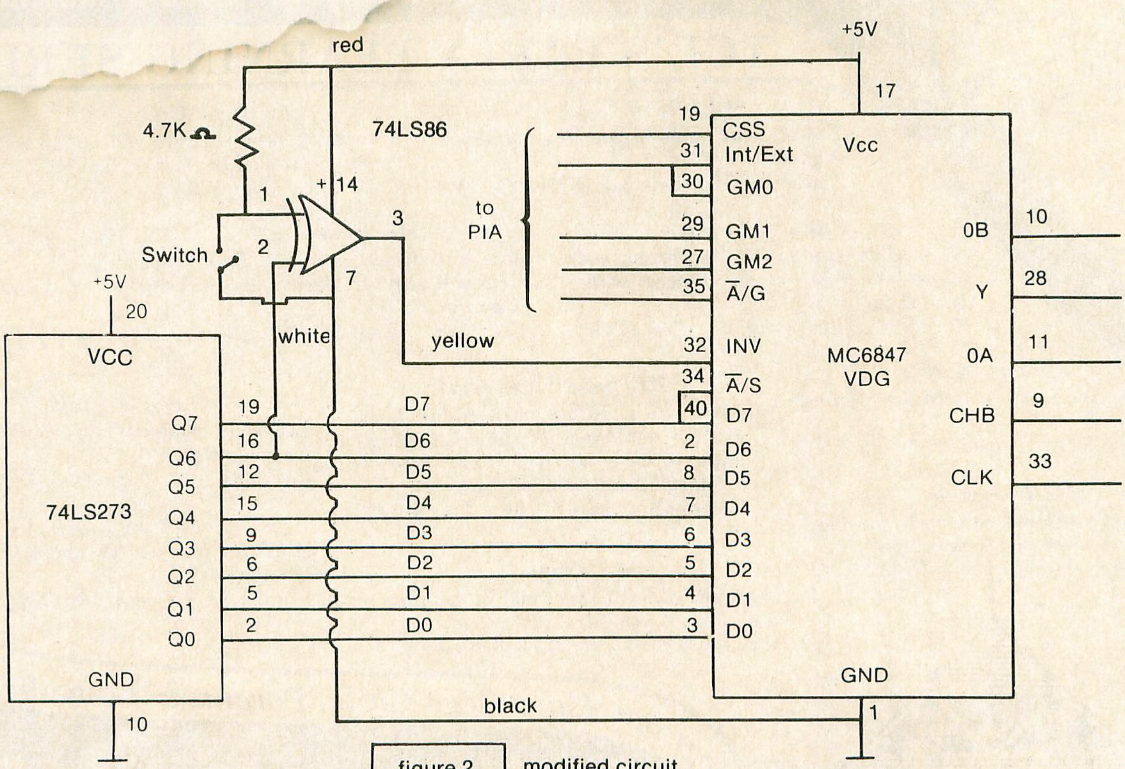
red
+5V
17
4.7K Ω
74LS86
1
+ 14
2
3
7
Switch
white
yellow
black
to PIA
19 CSS
31 Int/Ext
30 GM0
29 GM1
27 GM2
35 A̅/G
32 INV
34 A̅/S
40 D7
2 D6
8 D5
7 D4
6 D3
5 D2
4 D1
3 D0
Vcc
MC6847 VDG
0B 10
Y 28
0A 11
CHB 9
CLK 33
GND
1
+5V
20
VCC
74LS273
Q7 19 D7
Q6 16 D6
Q5 12 D5
Q4 15 D4
Q3 9 D3
Q2 6 D2
Q1 5 D1
Q0 2 D0
GND
10

figure 2 modified circuit

the output (3) will be inverted (see Table 1).

Table 1: Truth table of a dual input exclusive-or gate

input 1	input 2	output
0	0	0
0	1	1
1	0	1
1	1	0

Thus, when the switch is closed, the display of the Color Computer will be as it always has been: black characters on a green background. When the switch is open, all characters will be inverted and the characters will be green on a black background, except the lowercase characters, which remain inverted and now appear black on a green background.

The position of the switch may be changed any time and will not have any influence on the program the computer is running. Because the "invert" input of the VDG only affects the alpha-

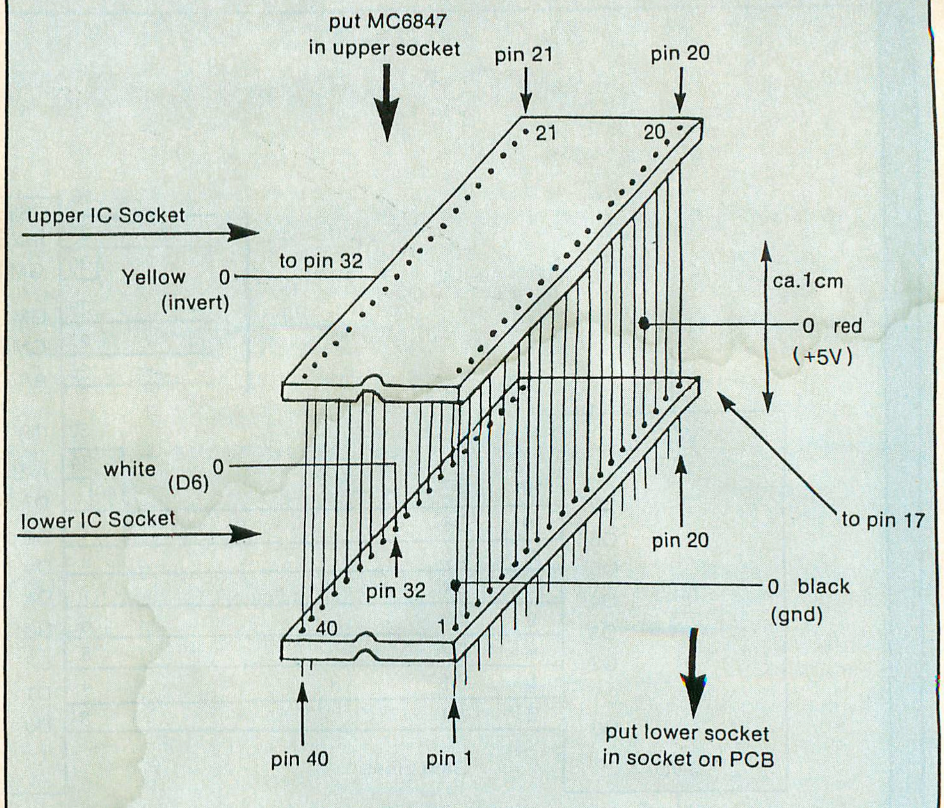

figure 3

(length of wires not drawn to scale)

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numerical mode, all graphics and semigraphic characters remain unchanged, independent of the position of the switch.

Since the change is in the digital part of the CoCo, the inverting of the display will work on any CoCo, independent of the TV system (NTSC, PAL) used. Generally, it will work on any computer, on any system, using the MC6847 Video Display Generator.

The Practical Work

When you open your CoCo, it is not difficult to find the MC6847 VDG; it is one of the five large 40-pin ICs. Because I did not like to cut a wire on the printed circuit board or to bend up a pin of the expensive VDG IC, I made a special construction with two IC sockets. To do the same, you need two 40-pin IC sockets, of which one can be plugged into the IC socket on the PCB of the computer. The MC6847 will be put in the other socket.

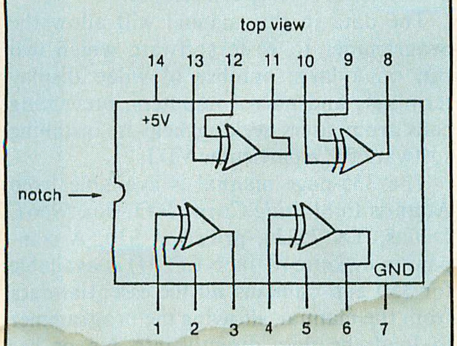

figure 4

connections of 74LS86 (quad exclusive-or gate)

Mount the socket, in which the MC6847 will be put, above the socket that will be put in the socket on the PCB, and interconnect all respective pins, except pin 32, with a piece of wire (see Figure 3). If you use short pieces (1 cm) of massive wire with a diameter of approximately 0.5 mm, the wires will be strong enough to support the upper socket with the MC6847. The wires to the switch and the exclusive-or gate will be soldered to this construction.

The switch used was a small slide switch that mounted at the bottom of my CoCo underneath the keyboard, using the ventilation holes there. If you use the switch very much, you can still mount the switch on top of your computer without leaving any holes in sight.

The exclusive-or gate used is a 74LS86, which is a quad exclusive-or gate, of which only one gate is used (Figure 4). I soldered the IC directly on the switch with pin 7 (ground).

You will need four wires to connect the switch and the exclusive-or gate to the construction with the two IC sockets, and I strongly recommend using different colors to avoid mistakes. Black, red, white and yellow are used here.

Connect one end of the black wire to pin 1 of the sockets of the VDG and connect the other end to one contact of the switch and pin 7 of the 74LS86. Then, connect the red wire to pin 17 of the VDG sockets and the other end to pin 14 of the 74LS86 and place a 4.7K Ω resistor between pin 14 of the 74LS86 and the other contact of the switch that also has to be connected to pin 1 of the 74LS86. Next, connect the white wire to pin 32 of the socket that will be put into the socket on the PCB (this is the only pin that is not connected to the upper socket) and connect the other end to pin 2 of the 74LS86. Finally, connect the yellow wire to pin 32 of the upper IC socket and to pin 3 of the 74LS86.

All unused pins of the 74LS86 may be left open. The components you need are listed in Table 2. It may be difficult to get IC sockets that fit in another IC socket, but they do exist and sometimes are called "precision IC sockets."

Table 2: Needed components

2- 40-pin IC sockets (see text)
1- IC 74LS86
1- slide switch
1- resistor 4.7K

After you have done all this, check carefully for short circuits, especially at the VDG chip, and be sure you placed the VDG chip and the IC sockets correctly in the computer (usually, pin 1 is marked on the PCB). Turn on your CoCo and see what happens at the TV screen. If you don't have a normal or inverted display, turn off your computer immediately and check for faults.

When you have inverted video, the background of the display can look dark green. This is because "black," generated by the VDG, actually *is* dark green. On most TV sets this background can be turned to black by re-adjusting the brightness and contrast controls of your TV set.

* * fss * *
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PIPELINE

ELECTRONIC HIRED HAND. *Successful Farming Farm Computer News* made its debut as a 100-page magazine with its January/February 1985 issue.

Published by Meredith Corp., *Farm Computer News* will regularly feature reviews of software made specifically for farm and agribusiness management, reviews of computer hardware and a guest column from an expert in the agricultural computer world.

The magazine also features tested templates (line-by-line outlines) for programs farmers can use with commercially prepared software, such as financial spreadsheets.

A one-year subscription to *Farm Computer News* is $20 for six issues. Write to: *Successful Farming*, Locust at 17th, Des Moines, IA 50336, or call (515) 284-3000.

* * *

TUNE IN. CompuServe Inc. will sponsor a radio series beginning in May that will allow subscribers to its Information Services to interact with the program via their personal computers.

"The Online Computer Connection" is a five-minute feature program on computers and computing. Listeners who are CompuServe subscribers will be able to ask questions, request more detailed information about radio segments and suggest topics for future programs. Occasionally, experts featured on the show will conduct online conferences.

Additional topics to be explored first from "The Online Computer Connection" roster of features will include: Electronic Mail: A Better Way; Security for Your PC; Computer Insurance: Questions and Answers; Mail Order vs. Electronic Computer Stores; User Groups Can Help; Kids, Computers and Education; Modems: The Best for Your Dollar; National PC Software Library; Home Businesses and Computers. Also, The Online Computer Connection program schedule will regularly include hardware reviews, software reviews and computer book reviews.

* * *

COMPUTERS IN EDUCATION, being held October 18-20, 1985, at the Sheraton Centre Hotel in New York City, is a major computer trade show devoted exclusively to education applications.

The event will feature exhibits and product demonstrations by manufacturers and publishers of computer hardware and educational software, geared to both school and home use.

Seminars, conducted by leading innovators in the field of "educational computing," will be held in conjunction with the three-day exhibit. These seminars will focus on how to integrate computers into the educational process and will explore the impact of technology on curricula, teaching and learning.

For more information on attending or exhibiting at "Computers in Education," please contact Carole Dornblaser at Conference Management Corporation, 17 Washington Street, Norwalk, CT 06854, (203) 852-0500.

* * *

EDUCATIONAL TOOL. With the coming of age of the computer as an educational tool, teachers and administrators must develop an informed sense of direction concerning the use of this technology. Often hardware and software may not be utilized to their full potential, and ways in which computer assisted instruction can be used to enhance or reinforce traditional methods are often overlooked.

Parent-Teacher's Microcomputing Sourcebook for Children 1985, published by R.R. Bowker, addresses the problems, questions and concerns inherent in such a revolutionary step as the introduction of the computer to the classroom and the home.

The book provides sound advice on selecting both hardware and software, as well as utilizing computers to their fullest potential. To this end, hardware and software checklists are provided to enable the user to pinpoint the best equipment for the intended use. Ideas on explaining the function of a computer to young people are presented, such as having the children physically "act out" the inner workings of the machine to give them a better concept of what happens and why. Other ideas include organizing field trips to large computer facilities, or having a local computer expert visit the classroom.

To order, please write: Customer Service, R.R. Bowker Company, P.O. Box 1807, Ann Arbor, MI 48106; or telephone toll-free 1-800-521-8110.

* * *

COCO ON THE CURRICULA. The *Journal of Computers in Mathematics and Science*, published by the non-profit Association for Computers in Math and Science Teaching, is a professional quarterly publication for mathematics and science teachers at all levels interested in instructional uses of computers. It provides a forum for the exchange of information about teaching mathematics and science with computers and the impact of computers on the curricula.

Articles feature descriptive uses of computers to enhance mathematics and science instruction, and research studies on teaching with computers. Regular columns include: "Learning with LOGO," "BASIC Tools," an annotated bibliography, and conference abstracts. Departments include: reviews of software and books, program listings, announcements of events, new products and books, and the latest news in computing.

For further information, contact *JCMST*, P.O. Box 4455, Austin, TX 78765.

* * *

VDT GUIDANCE. *A Programmer's Guide to Video Display Terminals* provides software developers with a quick reference to the control codes used in over 150 VDTs and microcomputers.

Clear screen, cursor positioning, screen format, video attributes and program function keys are just a few of the control codes presented in 145 data sheets contained in this manual. A chapter of hints and instruction on VDT programming is also included, offering valuable information for both the casual programmer as well as the professional software developer.

The data in this manual will allow the programmer to write software which will run on a large number of video display terminals and microcomputers, preventing calls from users seeking help in installing software for a particular VDT.

The 335-page manual is available from Atlantis Publishing Corp., P.O. Box 59467, Dallas, TX 75229, priced at $30. A companion diskette (8- inch CP/M) is available for $50 and contains all the essential data from the manual, allowing the programmer to load the data directly into his or her terminal installation routine.

* * *

ON YOUR MARKERS . . . Two new types of markers designed specifically for use on computer software have been introduced by Sanford Corp.

There is growing need for these new markers with the widespread use of disks and diskettes.

One of the new markers called "Diskribe" has ink which is quick-drying and permanent. Tests verify that the markings do not affect information on the disk itself.

Availability of two distinct Diskribe colors — one silver and one gold — enables users to color code disk markings to identify different kinds of data.

The other marker, the Label pen, meets the need for a writing instrument that really takes on slick-finish and other hard-to-mark labels currently being used on disks, diskettes and VCR cassettes.

By utilizing both the Diskribe markers and Label pens, users can employ up to five different colors to code data and entries. For more information, contact the Sanford Corp., 130 East Randolph Street, Chicago, IL 60601.

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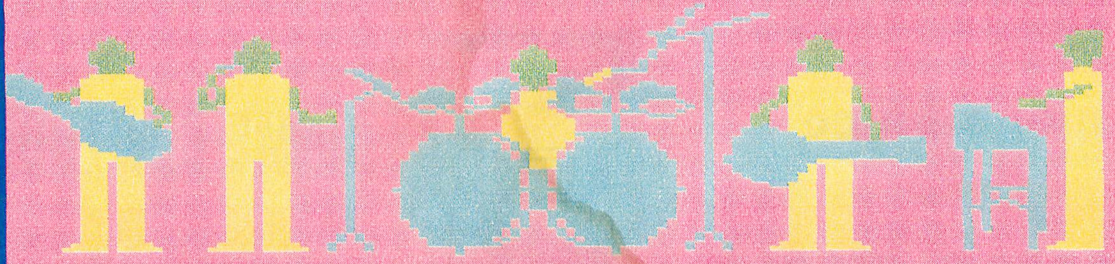
Live And In Concert On CoCo's Stage

By Brian Roden



If you're a music video fan, you may want to see a little variety of this entertainment portrayed by your very own CoCo. *Concert* is an animated graphics program that draws a contemporary band (lead guitar, lead vocal, drums, bass and keyboard) and animates the figures while playing music from the cassette player through the TV speaker. *Concert* requires a 16K Color Computer with Extended Color BASIC.

Program Summary

The program starts at Line 200 so you can enter your own lines to draw a group logo on the top half of the display screen.

Lines 210 through 620 draw the band in the initial position. Line 630 then starts the cassette and displays the graphics screen. Lines 640 through 680 make the changes necessary to display the second position of the group. Then, lines 710 through 750 return the band to their original position.

Lines 700 and 770 check the keyboard to see if you have pressed the 'E' key, which turns off the cassette and ends the program.

Running the Program

Before running the program, type `PCLEAR 4` and press ENTER. Next, insert your music cassette in the player and press Play, then type `RUN` and press ENTER. When you want to stop the program, press 'E' and the computer will stop the cassette motor. You may then press Stop on the player and remove the tape.

(Brian Roden is a sophomore at Northeast High School in North Little Rock, Ark., where his favorite subject is math. He is an honors student and hopes to enter the computer science field after college.)

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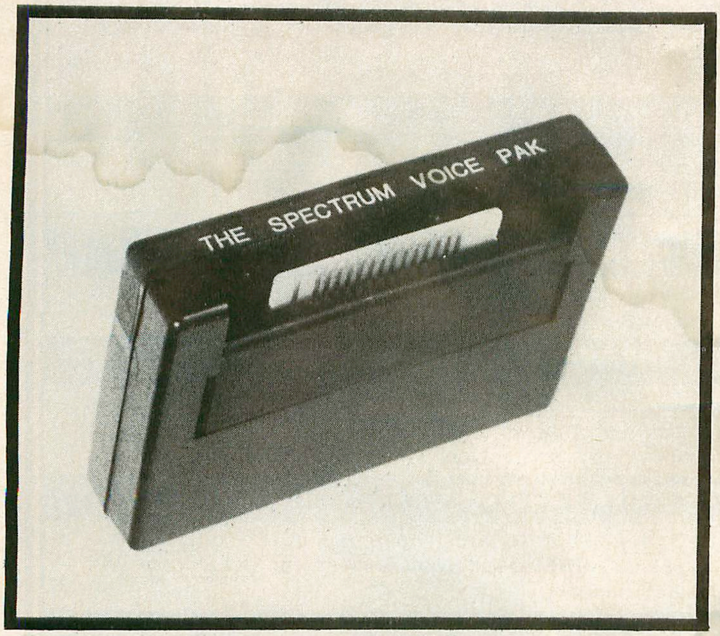

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BLACKJACK ROYALE

A Hi-Res graphics casino blackjack simulation and card counting tutor. Fully realistic play includes: double down, splits, surrender, insurance bets, 1-8 decks, burnt cards, shuffle frequency and more! "This fine program is a must for the CoCo Blackjack player." (Aug '83 Rainbow Review) 32K TAPE/DISK **$24.95** (also see Dec '84 Rainbow Review)

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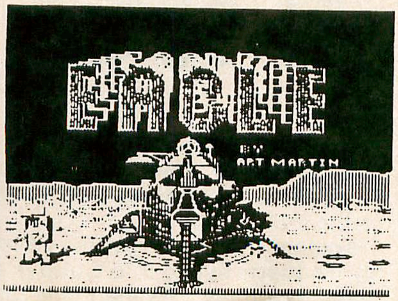
```
200 PMODE3,1:PCLS8
210 DRAW"BM24,133C5G1D1G2D1F2D1F
1R1E1U1E2U1H2U1H1"
220 PAINT(24,134),5,5
230 DRAW"BM20,141C6R8F2D8L3U3L2U
1L6U5"
240 PAINT(24,144),6,6
250 DRAW"BM14,179C6R3U1F1R1U23F1
D22R2U21R2D1R2D20R2U20F2D18R2U1F
1R1"
260 DRAW"BM2,142C7R1D3F1R1F1R3F1
R1F1R1F1R1F1R1D1F1R1D2F1R1F1R3F1
R3F1R3E1R1E1U4H1L1H1L3H1L1H1L1U1
H1L7D1L2H1L1H1L1H1L1H1L1U1H1L1H1
L2"
270 PAINT(20,152),7,7
280 DRAW"BM16,144C5D1L4D1R2;BM32
,144D3F2D3G1D1L2"
290 DRAW"BM56,133C5G1D1G2D1F2D1F
1R1E2U1E1U1H2U1H1"
300 PAINT(56,136),5,5
310 DRAW"BM52,141C6R9F1D12L12U12
"
320 PAINT(56,144),6,6
330 DRAW"BM50,155R13D23R2F1L8U20
L3D20L8E1R2U22R13"
340 PAINT(56,157),6,6
350 DRAW"BM48,144C5D3L1D1L2U4E1R
1U2E1U1R1C7R2;BM64,144C5D4R1F1D6
"
360 DRAW"BM72,179C7E4R1NF4U28E1R
1E1R1E1U2L2U1L2U1L2;BM84,143D2R3
D1F1"
370 CIRCLE(100,166),14,7:CIRCLE(
134,166),14,7:PAINT(100,166),7,7
:PAINT(134,166),7,7
380 DRAW"BM109,154C7F1R1F4D2F1D8
G2D2G3L1G1;BM126,154G1L1G4D2G1L3
ND8R3D8F2D2F3R1F1R1"
390 DRAW"BM91,148U2F1R1U2E1D3R3U
3F1D2G1L1G1L3H1;BM99,149F1R1ND1E
1R1E1R5E4U1L1H1D5L3U5G2D1L2NU1G2
"
400 DRAW"BM119,145R2D2U3R2U2D6R2
D1U7F2D1R2NU1R2F1D3NL6R1F2U1E1R2
U5G1D2R4U4R2D3R2U2R2D2F1R1F1G1L1
G1L5H1L1"
410 DRAW"BM150,179E4R1NF4U44E1R3
E1R3E1NR2G1L3G1L3G1L1G1L3G1L5D2N
G4U3NL1R2E6"
420 DRAW"BM116,135C5G1D1G2D1F2D1
F1R1E1U1E2U1H2U1H1"
430 PAINT(116,139),5,5
440 DRAW"BM115,145C6R6G1L1G1F3R2
F1D4L2D2G2D2L4U4L2U2L2H1U4E3U2"
450 PAINT(116,148),6,6
460 DRAW"BM94,140C7R6C6D1R3D1R2D
1"
470 DRAW"BM178,133C5G1D1G2D1F2D1
F1R1E1U1E2U1H2U1H1"
480 PAINT(178,136),5,5
490 DRAW"BM174,141C6R9F2D12L11H2
U11R1E1"
500 PAINT(178,148),6,6
510 DRAW"BM169,179R2U1F1U14E2D16
R2U18E1R3D19R2U19R2D19R2U1F1R1"
520 DRAW"BM200,155C7L4G1L21H2L2H
1L7D2L2D3G1D1F3R3D1R2NU1F1R3E5R1
E1R17F1R5U5"
530 PAINT(166,159),7,7
540 DRAW"BM170,144C5D3G2D2G1D4R2
;BM187,144D3F2D2F2D2"
550 DRAW"BM238,132L4G3F4R1E3U4"
560 PAINT(234,136),5,5
570 DRAW"BM234,140C6R3F2D37L10E1
R3U37E1"
580 PAINT(236,144),6,6
590 DRAW"BM208,148C7R7D1F2R2F2R2
F2R2D2L19U9;BM211,179U9NU12R4ND5
U13"
600 DRAW"BM226,175U17L2D12ND9L2H
1L1H1L1NG1U2L2R7"
610 PAINT(214,152),7,7
620 DRAW"BM223,151C5U1R2U1R2U1R2
U1R2U1R2U1R2U1R2"
630 AUDIOON:MOTORON:SCREEN1,1
640 DRAW"BM34,148C8D3G1C7D2L2;BM
34,148C5D1R2D2L2"
650 DRAW"BM66,149C8D6;BM66,149C5
F1R6U1D2L6"
660 DRAW"BM94,140C8R6D1R3D1R2D1;
BM128,143C6E1R2U1R2U1R2C7R6"
670 DRAW"BM168,148C8D3G1C7D4R2;B
M168,147C5D1L2D2L2D2"
680 DRAW"BM222,151C8U1R2U1R2U1R2
U1R2U1R2;BM222,148C5R5U1NL4E1R2U
1NL2"
690 FORX=1TO20:NEXTX
700 Z$=INKEY$:IFZ$="E"THEN780
710 DRAW"BM34,148C8D1R2D2L2;BM34
,148C5D3G1D2L2"
720 DRAW"BM66,149C8F1R6U1D2L6;BM
66,149C5D6"
730 DRAW"BM128,143C8E1R2U1R2U1R8
;BM104,143C6U1L2U1L2U1L2C7L4"
740 DRAW"BM168,147C8D1L2D2L2D2;B
M168,147C5D3G1D4"
750 DRAW"BM222,148C8R5U1NL4E1R2U
1NL2;BM222,151C5U1R2U1R2U1R2U1R2
U1R2"
760 FORX=1TO20:NEXTX
770 Z$=INKEY$:IFZ$<>"E"THEN640
780 AUDIOOFF:MOTOROFF
```

Saguaro Software



EAGLE

A graphic-enhanced lunar lander simulator. The pilot breaks out of lunar orbit and attempts a soft landing on the lunar surface. Joysticks control thrust and craft altitude and information is continually displayed on horizontal and vertical velocities, acceleration values, vertical and horizontal distances from target, fuel consumption and much more. On advanced levels, problems such as fuel leaks and computer screen failures can provide hair-raising final approaches. Disk version allows choice of landing site between Mars and Earth's moon. Takeoffs from the surface can be made and the upper stage placed back in orbit. The simulation is as educational as it is fun and exciting. A great tool for that future astronaut or physicist. 32K, 2 joysticks required. Available in tape or an enhanced disk version.

Tape - $24.95　Disk or Amdek - $29.95

Sketchpad

A graphics drawing program designed to provide the computer hobbyist with easy manipulation of the powerful graphics capabilities of the CoCo. Advanced programmers can design graphics screens and characters for Basic and ML programs and games. Sketchpad was used to create the graphics for "Eagle" (see above). 32K, 2 Joysticks and disk drive required. Disk or Amdek - $29.95.

Testmaker

Menu-driven series that creates mult. choice & T/F tests. Output to screen or printer. 32K Disk, $29.95.

Maycode

A 6809 disassembler. Reads & converts object codes to 6809 Assem. Lang Mnemonics 16K min. Tape, $24.95. Disk or Amdek, $29.95.

TDIR

A menu-driven tape directory. Allows complete directory control. 16K. Tape, $24.95.

Alphacopy

It is nice to have an alphabetized disk directory, but if that should crash, it doesn't help tell you where the programs are. Alphacopy will fully alphabetize your disk; that is, write the programs in alphabetical order. Each program will be written on the same or consecutive sectors, thus making rebuilding of the disk much easier with the other currently available disk "zapping" utilities. ALPHACOPY will also allow you to format disks up to 80 tracks if your drive allows, thus giving you more space to store programs per disk. 32K. Disk or Amdek - $24.95.

The Digestive System

An educational quiz game for 2 players that covers different aspects of the human digestive system. Each question is assigned a point value relative to its difficulty. A fun way to learn about a not-so-fun subject. 16K.

The Circulatory System

Using the same format as "The Digestive System," this program covers the heart, lungs, veins, arteries, blood, etc. 16K.

Both Only:
Tape - $19.95. Disk or Amdek - $24.95.

Co-Co Receivables

Keep track of all those accounts with current list of accounts, statement printing, last activity date, and current month's transactions, debits & credits. Disk storage of data. 32K disk, $29.95.

Stars Of America

Education should be fun - this program is just that! This tutorial uses 25 of the superstars of American history, from George Washington to Ronald Reagan.

The Civil War

A challenging two - person game. Questions cover Carpet Baggers to the Battle of Vicksburg. Points are assigned according to the difficulty of the question, scores are displayed throughout the game.

Both Only: Tape 19.95. Disk 24.95

History From 1863 To 1976

On two 16K non-extended tapes. For 1-4 people. Informative & fun way to learn important dates in world history. Written for students by a teacher. Tape - $19.95. Disk or Amdek - $24.95.

Treasure Hunt

A graphics text adventure. You walk with our graphics character through desert, mountains and city to seek the illusive treasure of gold. Super graphics with a person who walks with you at each turn. 64K. Disk & Amdek only - $29.95.

Loveless Manor

Trapped in a bedroom by your evil aunt, you've admired Queen Cinderella's castle in the distance... and you've just discovered she's a distant cousin. Can you escape to her protection? 32K. Great word adventure. Tape - $19.95. Disk or Amdek - $24.95.

Raid On Burdanovka

Your mission, should you decide to accept it, is to steal Russia's newest weapon and save the world. Text adventure with 50 rooms. 32K. Tape - $24.95. Disk or Amdek - $29.95.

Search For The Llangth

After years of study & searching, you have at last traced the alien race of Llangth to this valley. Now your quest for the power of Llangth begins! Tape - $24.95. Disk or Amdek - $29.95.

OTHXO

Othello machine language game for the 16K Ext CoCo. 2 modes of play - you against a friend or you against the computer. When playing the computer, it will play hard or easy. Object of the game is to change the opponent's spots to yours by placing your marker at the end of a row started by your marker. Not as easy as it sounds! Tape, $24.95. Disk or Amdek, $29.95.

Co-Co Keno

Bring Las Vegas' Keno game home with Co-Co Keno. Bet $1, $3 or $5 & mark off 1 to 15 spots...can you beat the odds & win $50,000? 16K, high resolution screen. Keno chart print included. Tape, $24.95. Disk or Amdek $29.95.

CoCo Favorites!

Worlds of Flight	32K	23.75
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Trekboer	32K	19.75
Tut's Tomb	32K	19.75
Time Fighter	16K	19.75
Zookey Typing Tutor		19.75
Accounting System	32K Disk	79.75
To Preserve Quandic	Disk	29.75
Gravitor		15.75
Compleat Enchanter		18.75
Lizpack	Stat. Anal. - 8 Disks	145.00
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Weather Pro	32K	19.75
Telepatch 64	Disk Only	14.75
Super Screen Machine		33.75
Rainbow Screen Machine		22.75
Tims		20.75

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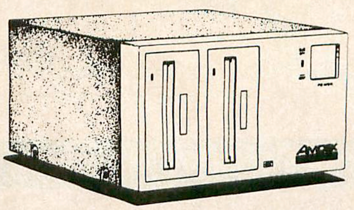
Hardware, Too!



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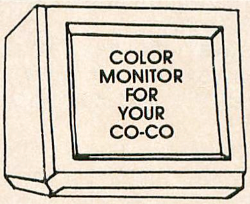

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Mark Data Universal Video Driver

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ESK 5 1/4" Disks - DSDD	Box Of 10	**$21**

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Amdek 3" Diskettes	Box Of 10	**$35**

This Month's Special!

Gravitor

The amazing thing about the all machine language Gravitor is that it fits into 16K machines and still gives you 16 levels of play, 10 hi-res color playing screens, multiple voice music, and a practice mode. You fly from planet to planet (each different) and attempt to destroy the enemy bases. Or, you can challenge the twisting passages to the reactor on the death base. Keyboard control.

Tape $15.75	Disk $18.75
Reg. $18.75	Reg. $21.75

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AUTHORS! ASK ABOUT OUR ROYALTY PROGRAM

RAINBOW Info

How To Read Rainbow

Please note that all the BASIC program listings you will find in THE RAINBOW are formatted for a 32-character screen — so they will show up just as they do on your CoCo screen. One easy way to check on the accuracy of your typing is to compare what character "goes under" what. If the characters match — and your line endings come out the same — you have a pretty good way of knowing that your typing is accurate.

We also have "key boxes" to show you the *minimum* system a program needs. But, *do* read the text before you start typing.

Finally, the little cassette symbol on listings indicates that program is available through our RAINBOW ON TAPE service. An order form for this service is on the insert card bound in the magazine.

What's A CoCo

CoCo is an affectionate name which was first given to the TRS-80 Color Computer by its many fans, users and owners. As such, it is almost a generic term for three computers, all of which are very much alike.

When we use the term CoCo, we refer to the TRS-80 Color Computer, the TDP System-100 Computer and the Dragon-32 Computer. It is easier than using the three "given" names throughout THE RAINBOW.

In most cases, when a specific computer is mentioned, the application is for that specific computer. However, since the TDP System-100 and TRS-80 Color are, for all purposes, the same computer in a different case, these terms are almost always interchangeable.

The Rainbow Check Plus

The small boxes that you see accompanying programs in the THE RAINBOW are the "Check system," which is designed to help you type in programs accurately.

Rainbow Check PLUS will count the number and values of characters you type in. You can then compare the number you get to those printed in THE RAINBOW. On longer programs, some benchmark lines are given. When you reach the end of one of those lines with your typing, simply check to see if the numbers match.

To use the *Rainbow Check PLUS,* type in the program and CSAVE it for later use, then type in the command RUN and press ENTER. Once the program has run, type NEW ENTER to remove it from the area where the program you're typing in will go.

Now, whenever you press the down arrow key, your CoCo will give you the checksum based on the length and content of the program in memory. This is to check against the numbers printed in THE RAINBOW. If your number is different, check the listing carefully to be sure that you typed in the correct BASIC program code. For more details on this helpful utility, refer to H. Allen Curtis' article on Page 21 of the February 1984 RAINBOW.

Since *Rainbow Check PLUS* counts spaces and punctuation, be sure to type in the listing exactly the way it's given in the magazine.

```
10 CLS:X=256*PEEK(35)+178
20 CLEAR 25,X-1
30 X=256*PEEK (35)+178
40 FOR Z=X TO X+77
50 READ Y:W=W+Y:PRINT Z,Y;W
60 POKE Z,Y:NEXT
70 IFW=7985THEN80ELSEPRINT
      ''DATA ERROR'':STOP
80 EXEC X:END
90 DATA 182, 1, 106, 167, 140, 60, 134
100 DATA 126, 183, 1, 106, 190, 1, 107
110 DATA 175, 140, 50, 48, 140, 4, 191
120 DATA 1, 107, 57, 129, 10, 38, 38
130 DATA 52, 22, 79, 158, 25, 230, 129
140 DATA 39, 12, 171, 128, 171, 128
150 DATA 230, 132, 38, 250, 48, 1, 32
160 DATA 240, 183, 2, 222, 48, 140, 14
170 DATA 159, 166, 166, 132, 28, 254
180 DATA 189, 173, 198, 53, 22, 126, 0
190 DATA 0, 135, 255, 134, 40, 55
200 DATA 51, 52, 41, 0
```

Using Machine Language

Machine Language programs are one of the features of THE RAINBOW. There are a number of ways to "get" these programs into memory so that you can operate them.

The easiest way is by using an Editor-Assembler, a program you can purchase from a number of sources.

An editor-assembler allows you to enter mnemonics into your CoCo and then have the editor-assembler assemble them into specific instructions that are understood by the 6809 chip that controls your computer.

When you use an editor-assembler, all you have to do, essentially, is copy the relevant instructions from THE RAINBOW'S listing into CoCo.

Another method of getting an assembly language listing into CoCo is called "hand assembly." As the name implies, you do the assembly by hand. This can *sometimes* cause problems when you have to set up an ORIGIN statement or an EQUATE. In short, you have to know something about assembly to hand assemble some programs.

Use the following program if you wish to hand assemble machine language listings:

```
10 CLEAR200,&H3F00:1=&H3FB0
20 PRINT ''ADDRESS:'';HEX$(I);
30 INPUT ''BYTE'';B$
40 POKE I,VAL(''H''+B$)
50 I=I+1:GOTO 20
```

This program assumes you have a 16K CoCo. If you have 32K, change the &H3F00 in Line 10 to &H7F00.

The Rainbow Seal

RAINBOW
CERTIFICATION
SEAL

The Rainbow Certification Seal is our way of helping you, the consumer. The purpose of the Seal is to certify to you that any product which carries the Seal has been physically seen by us and that it does, indeed, exist.

Manufacturers of products — hardware, software and firmware — are encouraged by us to submit their products to THE RAINBOW for certification. We ascertain that their products are, in actuality, what they purport to be and, upon such determination, award a Seal. This lets you know that we have seen the product and that it does, indeed, exist.

The Seal, however, is not a "guarantee of satisfaction." The certification process is different from the review process. You are encouraged to read our reviews to determine whether the product is right for your needs.

There is absolutely no relationship between advertising in THE RAINBOW and the certification process. Certification is open and available to any product pertaining to CoCo. A Seal will be awarded to *any* commercial product, regardless of whether the firm advertises or not.

We will appreciate knowing of instances of violation of Seal use.

GAMEMASTER'S APPRENTICE

4K

Issuing Orders For Our Heroic Fantasy Adventurers

By George Firedrake and Karl Albrecht
Rainbow Contributing Editors

Last time we asked if you wanted us to run a play-by-mail game for beginners. Lots of you said yes, so we'll do it. In our game, you will run two characters. Your characters will go to a medieval festival and participate as you, the game player, dictate — unless, of course, the GameMasters or Dame Fortune decree otherwise.

This game is for beginners who have never played a role playing game. No previous experience is required. Your only costs will be a copy of *Adventurer's Handbook* and some self-addressed, stamped envelopes. Our game is rated G, intended as an enjoyable family experience — we encourage non-violence, cooperation, exploration, problem-solving and story-telling.

ROLE PLAYING GAMES

Millions of people play role playing games. A role playing game is a game in which one or more players create and play characters (adventurers) who live their imaginary lives in a specially made game world. The game world is created, managed and operated by a GameMaster (GM), referee, or dungeon master (DM).

Most people who play role playing games use a formal rule system. Some of the best known are shown below.

Bushido. *Fantasy Games Unlimited, P.O. Box 182, Roslyn, NY 11576.*

Champions. *Hero Games, 92A 21st Avenue, San Mateo, CA 94402.*

Dungeons & Dragons (D&D). *TSR, P.O. Box 756, Lake Geneva, WI 53147.*

RuneQuest (RQ). *Avalon Hill, 4517 Harford Road, Baltimore, MD 21214.*

Star Trek. *FASA, P.O. Box 6930, Chicago, IL 60680.*

Tunnels & Trolls (T&T). *Blade, P.O. Box 1467, Scottsdale, AZ 85252.*

Beginners beware! The rule books are formidable. If you are a beginner, we suggest you start with one of the following books, both from Reston Publishing Company, 1480 Sunset Hills Road, Reston, VA 22090.

Adventurer's Handbook: A Guide to Role Playing Games *by Bob Albrecht and Greg Stafford.*

You will also need **Adventurer's Handbook** *if you play our play-by-mail beginner's game. We call it DragonFun.*

Copyright© 1985 by DragonQuest, P.O. Box 7627, Menlo Park, CA 94026.

If you want to play, send a self-addressed, stamped envelope to *DragonFun*, P.O. Box 7627, Menlo Park, CA 94026-7627. We will send you the February 1985 issue of *DragonSmoke*, which includes the rules for playing *DragonFun*. (A self-addressed, stamped envelope is addressed to *you* and has an unused, first-class stamp on it. Put it in an envelope addressed to us.)

Heroic Fantasy

Last time we sent our team of adventurers to Flying Buffalo, Inc., where they were entered into game number 110. FBI's computer sent us the following information.

Name	Char	Orders
Sheri	27	(Entered)
Zamora	57	(Entered)
Tindil	139	(Entered)
Leiko	141	(Entered)
Aikhoun	142	(Entered)
Frona	146	(Entered)
Mariko	153	(Entered)
Steffi	163	(Entered)
Jonjari	191	(Entered)

Each character has been assigned a character number.

Entrance Room

Doors: North 25, East 25, South 25, West 25.

* (C27) Sheri: female human fighter, enters this level.

Str=15 Con=30 Prizes=1
P443: Healing potion (Use me)=100.

* (C57) Zamora: male human magic-user, enters this level.
Str=10 Con=30 Prizes=1
P511: Healing potion (Use me)=100.

* (C139) Tindil: male elf fighter, enters this level.
Str=25 Con=25 Prizes=1
P330: Healing potion (Use me)=100.

* (C141) Leiko: female elf magic-user, enters this level.
Str=20 Con=25 Prizes=1
P404: Healing potion (Use me)=100.

* (C142) Aikhoun: male hobbit fighter, enters this level.
Str=5 Con=15 Prizes=1
P186: Healing potion (Use me)=100.

* (C146) Frona: female hobbit fighter, enters this level.
Str=5 Con=15 Prizes=1
P39: Healing potion (Use me)=100.

* (C153) Mariko: female hobbit magic-user, enters this level.
Str=4 Con=15 Prizes=1
P197: Healing potion (Use me)=100.

* (C163) Steffi: female hobbit magic-user, enters this level.
Str=4 Con=15 Prizes=1
P266: Healing potion (Use me)=100.

* (C191) Jonjari: male dwarf fighter, enters this level.
Str=30 Con=40 Prizes=1
P403: Healing potion (Use me)=100.

Our group is in the Entrance Room with four exit doors. Each exit door is followed by the number 25. What does that mean? We found the answer on Page 7 of the rulebook. This number is the size of the door, the number of characters who can pass through the door in each of the two movement phases. These are *big* doors!

What next? We decided to send five of our characters through the west door and leave our four magic-users in the Entrance Room to prepare magic spells.

Here are our orders.

Comments	**Char#**	**Orders**	
Sheri	C27	XOW	
Zamora	C57	YF	: Reality expands to fill the available fantasies
Tindil	C139	XOW	: Take a dragon to lunch!
Leiko	C141	YB	: But don't let a dragon take you to lunch.
Aikhoun	C142	XOW	: Let me at 'em!
Frona	C146	XOW	
Mariko	C153	YF	: Oh! You're not real!
Steffi	C163	YZ	: Eeeeeeeeeeeeeek!
Jonjari	C191	XOW	

Our orders tell Sheri, Tindil, Aikhoun, Frona and Jonjari to exit (x) the room through the west (w) door. Since these are big doors, we told them to use zero (0) strength. We found out how to do this under "Other Major Orders" on Page 6.

We ordered our magic-users to each prepare a spell, then go through the west door. Zamora and Mariko prepare a fireball (YF). Leiko prepares a blast spell (YB), and Steffi prepares a sleep spell (YZ). Look for information on preparing spells under "Major Magic" on Page 5.

We gave "speak" orders to seven characters. Speak orders are described under "Writing Your Orders" on Page 9 of the rulebook.

Well, that's it — our first set of orders. Remember, this is our first turn. We don't really know how to play, but will learn by playing. We expect to make some mistakes! We sent in our orders and, a few days later, received the results of our first turn.

Name	**Char**	**Orders**	
Sheri	27	XOW	
Zamora	57	YF	: Speech
Tindil	139	XOW	: Speech
Leiko	141	YB	: Speech
Aikhoun	142	XOW	: Speech
Frona	146	XOW	
Mariko	153	YF	: Speech
Steffi	163	YZ	: Speech
Jonjari	191	XOW	: Speech

(16 Orders)

Level 1 Characters=9 Party value=100

OK, the computer acknowledges our orders. It then tells us who is in the Entrance Room, including some new arrivals.

Entrance Room

Doors: North 25, East 25, South 25, West 25.

— (C18) Cronus: male troll, arrived from East.
"I guess you guys can come along with us."

— (C29) Hecate: female elf, arrived from East.
"Where are we now?"

* (C57) Zamora: male human magic-user, prepares Fireball.
Str=10 Con=30 (Has Fireball) Prizes=1
P511: Healing potion (Use me)=100

— (C95) Mage Crowley: male human, arrived from East. "Let's go. Do what thou wilt shall be the whole of the Law."

* (C141) Leiko: female elf magic-user, prepares Blast.
Str=20 Con=25 (Has Blast) Prizes=1
"But don't let a dragon take you to lunch."

One-Liner Contest Winner . . .

Drip should be painfully familiar to anyone who has had to deal with a leaky faucet!

The listing:

```
1 PMODE1:PCLS:SCREEN1:DRAW"BM0,2
0R40F10D6L16U4L34BD158C2R255":PA
INT(0,24),4,4:COLOR3:FORW=189TO3
8STEP-2:FORA=38TOW:PSET(34,A,3):
PSET(34,A,1):NEXTA:PLAY"L200O5AB
":LINE(0,W)-(255,W),PSET:NEXTW:D
RAW"BM34,191R8":PLAY"L16O1CE":PA
INT(0,38),1,4:GOTO1
```

Gay Crawford
Merriam, KS

(For this winning one-liner contest entry, the author has been sent copies of both *The Rainbow Book Of Simulations* and its companion *Rainbow Simulations Tape.*)

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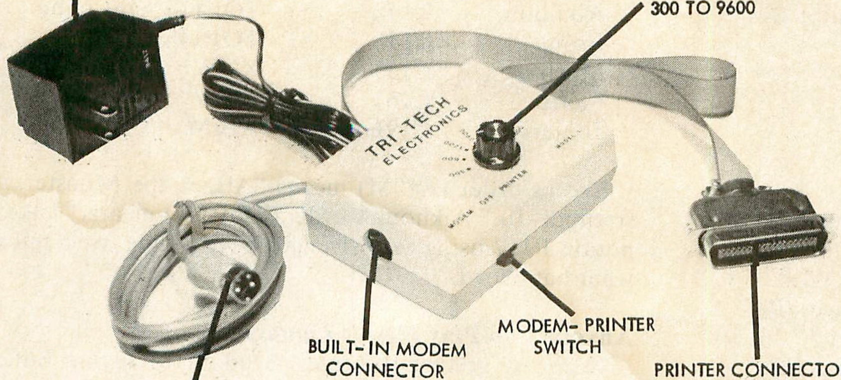
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P404: Healing potion (Use me)=100

* (C153) Mariko: female hobbit magic-user, prepares Fireball.
Str=4 Con=15 (Has Fireball) Prizes=1
"Oh! You're not real!"
P197: Healing potion (Use me)=100

* (C163) Steffi: female hobbit magic-user, prepares Sleep.
Str=4 Con=15 (Has Sleep) Prizes=1
"Eeeeeeeeeeeeeeek!"
P266: Healing potion (Use me)=100

Characters who left here:

* (C27) Sheri: female human fighter, moves (0) West.

* (C139) Tindil: male elf fighter, moves (0) West.

(C142) Aikhoun: male hobbit fighter, moves (0) West.

(C146) Frona: female hobbit fighter, moves (0) West.

* (C191) Jonjari: male dwarf fighter, moves (0) West.

Four of our characters are in the Entrance Room with three strangers, newly arrived. The other five of our team left through the west door. Here is where they are.

Dusty Room

Doors: North 5, East 25, South 3, West 3.
Monster: Brown Bear.
P117: Potion P145: Potion P204: Potion

* (C27) Sheri: female human fighter, arrived from East.
Str=15 Con=30 Exp=5 Prizes=1
P443: Healing potion (Use me)=100.

* (C139) Tindil: male elf fighter, arrived from East.
Str=25 Con=25 Exp=5 Prizes=1
"Take a dragon to Lunch!"
P330: Healing potion (Use me)=100.

* (C142) Aikhoun: male hobbit fighter, arrived from East.
Str=5 Con=15 Exp=5 Prizes=1
"Let me at 'em!"
P186: Healing potion (Use me)=100.

* (C146) Frona: female hobbit fighter, arrived from East.
Str=5 Con=15 Exp=5 Prizes=1
P39: Healing potion (Use me)=100.

* (C191) Jonjari: male dwarf fighter, arrived from East.
Str=30 Con=40 Exp=5 Prizes=1
"If you get in my way, the back of my hand to you!"
P403: Healing potion (Use me)=100.

We decided to do the following: 1) Order Sheri, Tindil *and* Jonjari to attack (A) the monster (M) with full strength. 2) Order Aikhoun to take (T) potion P117 and Frona to take potion 145. Since no one is contesting their right to do this, we will assign zero strength to each order. 3) Order our adventurers still in the Entrance Room to exit through the west door.

Here are the orders.

Comments	**Char#**	**Orders**	
Sheri	C27	A10M	
Zamora	C57	XOW	: Ta da!
Tindil	C139	A15M	: Charge!
Leiko	C141	XOW	
Aikhoun	C142	TOP117	: It's mine!
Frona	C146	TOP145	
Mariko	C153	XOW	
Steffi	C163	XOW	
Jonjari	C191	A20M	: Take this!

Sheri's order (A10M) means "Attack the Monster with strength=10." Aikhoun's order (TOP117) means "Take the potion P117 using zero strength." Next time, we'll tell you what happened.

Anyone Can Play *Heroic Fantasy*

Begin by getting the rules. Send $1 to Flying Buffalo, Inc., P.O. Box 1467, Scottsdale, AZ 85252-1467. Then design a team of adventurers and send them in. You will be charged a set-up fee and a fee for every turn. We suggest you make a turn every two weeks or one turn a month.

Your team can have up to 15 characters selected from the following character types.

Code	Kindred	Class	STR	CON	Cost
F	Fairy	Fighter	1	1	1
F	Fairy	Magic-user	1	1	2
G	Gremlin	Fighter	3	4	3
L	Leprechaun	Magic-user	3	4	4
H	Hobbit	Fighter	5	15	5
H	Hobbit	Magic-user	4	15	7
K	Goblin	Fighter	7	20	6
P	Human	Fighter	15	30	9
P	Human	Magic-user	10	30	11
E	Elf	Fighter	25	25	15
E	Elf	Magic-user	20	25	18
D	Dwarf	Fighter	30	40	23
D	Dwarf	Magic-user	30	40	36
O	Ogre	Fighter	35	40	29
O	Ogre	Magic-user	35	40	46
T	Troll	Fighter	50	50	57
X	Giant	Fighter	60	60	72

Note that each character type has a cost. You have 100 points to spend in designing your team. The CoCo can help. Here are three programs bundled together.

Scan Character Types Program

```
1000 REM**SCAN CHARACTER TYPES
1010 CLS
1020 RESTORE       'START AT TOP
1030 GOSUB 11010 'READ RECORD
1040 GOSUB 12010 'SHOW RECORD
1050 GOSUB 10010 'TELL HOW AGAIN
1099 '
1100 REM**START OVER IF ENDFILE
1110 IF KIN$="ENDFILE" THEN 1020
 ELSE 1030
```

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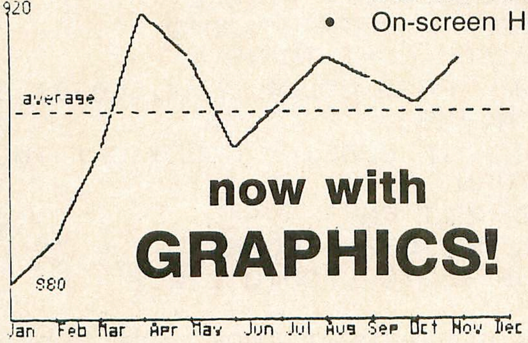

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Compute Cost Ratios Program

```
2000 REM**COMPUTE COST RATIOS
2010 CLS
2020 RESTORE       'START AT TOP
2030 GOSUB 11010 'READ RECORD
2040 GOSUB 13010 'COST RATIOS
2050 GOSUB 14010 'SHOW RATIOS
2060 GOSUB 10010 'TELL HOW AGAIN
2099 '
2100 REM**START OVER IF ENDFILE
2110 IF KIN$="ENDFILE" THEN 2020
 ELSE 2030
```

Design Character Group Program

```
3000 REM**DESIGN CHARACTER GROUP
3010 DIM CODE$(13),CLASS$(13),ST
R(13),CON(13),PTS(13)
3020 RESTORE       'START AT TOP
3030 GOSUB 15010 'PRINT LIST
3040 GOSUB 16010 'GET CHARACTER
3050 GOSUB 15010 'REPRINT LIST
3060 GOSUB 17010 'GET CODE
3070 GOSUB 15010 'REPRINT LIST
3080 RESTORE       'START AT TOP
3090 GOSUB 18010 'GET CLASS
3100 GOSUB 15010 'REPRINT LIST
3110 GOSUB 10010 'TELL HOE AGAIN
3199 '
3200 REM**START OVER
3210 GOTO 3020
```

These three programs use a collection of subroutines in lines 10000 through 18070.

```
10000 REM**DO AGAIN SUBROUTINE
10010 PRINT @480, "TO DO AGAIN,
PRESS space bar";
10020 IF INKEY$="" THEN 10020
ELSE RETURN
10099 '
11000 REM**READ RECORD SUBR.
11010 READ CODE$,KIN$,CLASS$,STR
,CON,PTS
11020 RETURN
11099 '
12000 REM**SHOW RECORD SUBR.
12010 PRINT @480, CODE$ TAB(2)
KIN$ TAB(16) CLASS$ TAB(19) STR
TAB(23) CON TAB(27) PTS
12020 RETURN
12099 '
13000 REM**COST RATIOS SUBR.
13010 IF KIN$="ENDFILE" THEN
SC=0: CC=0: RETURN
```

```
13020 SC = STR/PTS
13030 SC = INT(100*SC+.5)/100
13040 CC = CON/PTS
13050 CC = INT(100*CC+.5)/100
13060 RETURN
13099 '
14000 REM**SHOW COST RATIOS SUBR
14010 PRINT @480, CODE$ TAB(2)
CLASS$ TAB(5) STR TAB(9) CON
TAB(13) PTS TAB(17) SC TAB(24)CC
14020 RETURN
14099 '
15000 REM**SHOW CURRENT LIST
15010 CLS : TSTR=0:TCON=0:TPTS=0
15020 PRINT " C# CODE CLASS   ST
R  CON  COST"
15030 FOR CN=1 TO 13
15040   PRINT CN;TAB(5);CODE$(CN
);TAB(10);CLASS$(CN);TAB(17);STR
(CN);TAB(22);CON(CN);TAB(27);PTS
(CN)
15050   TSTR = TSTR + STR(CN)
15060   TCON = TCON + CON(CN)
15070   TPTS = TPTS + PTS(CN)
15080 NEXT CN
15090   PRINT "TOTALS:";TAB(17);
TSTR;TAB(22);TCON;TAB(27);TPTS
15099 '
15100 RETURN
16000 REM**INPUT CHARACTER
16010 PRINT @480, "CHARACTER #";
: INPUT CP
16020 IF CP<1 OR CP>13 THEN GOSU
B 15010 : GOTO 16010
16030 RETURN
16099 '
17000 REM**INPUT AND CHECK CODE
17010 PRINT @480, "CODE? ";
17020 CODE$(CP) = INKEY$ : IF CO
DE$(CP) = "" THEN 17020
17030 FOR CN=1 TO 18
17040   READ CODE$,DUM$,CLASS$,S
TR,CON,PTS
17050   IF CODE$ = CODE$(CP) THE
N RETURN
17060 NEXT CN
17070 RESTORE : CODE$(CP) = "" :
 GOSUB 15010 : GOTO 17010
17099 '
18000 REM**INPUT AND CHECK CLASS
18010 PRINT @480, "CLASS? ";
18020 CLASS$(CP) = INKEY$ : IF C
LASS$(CP) = "" THEN 18020
18030 FOR CN=1 TO 18
18040 READ CODE$,DUM$,CLASS$,STR
,CON,PTS
```

```
18050 IF CODE$=CODE$(CP) AND CLA
SS$=CLASS$(CP) THEN STR(CP)=STR:
CON(CP)=CON:PTS(CP)=PTS : RETURN
18060 NEXT CN
18070 RESTORE : CLASS$(CP) = ""
: GOSUB 15010 : GOTO 18010
18099 '
```

The three programs also use a common database of *Heroic Fantasy* character types in lines 32000 through 32180.

```
32000 REM**HEROIC FANTASY GMA 21
32002 REM**CHARACTER TYPES
32004 REM**CODE$,KIN$,CLASS$,STR
,CON,PTS
32010 DATA F,FAIRY,F,1,1,1
32020 DATA F,FAIRY,M,1,1,2
32030 DATA G,GREMLIN,F,3,4,3
32040 DATA L,LEPRECHAUN,M,3,4,4
32050 DATA H,HOBBIT,F,5,15,5
32060 DATA H,HOBBIT,M,4,15,7
32070 DATA K,GOBLIN,F,7,20,6
32080 DATA P,HUMAN,F,15,30,9
32090 DATA P,HUMAN,M,10,30,11
32100 DATA E,ELF,F,25,25,15
32110 DATA E,ELF,M,20,25,18
32120 DATA D,DWARF,F,30,40,23
32130 DATA D,DWARF,M,30,40,36
32140 DATA O,OGRE,F,35,40,29
32150 DATA O,OGRE,M,35,40,46
32160 DATA T,TROLL,F,50,50,57
32170 DATA X,GIANT,F,60,60,72
32180 DATA Z,ENDFILE,Z,0,0,0
```

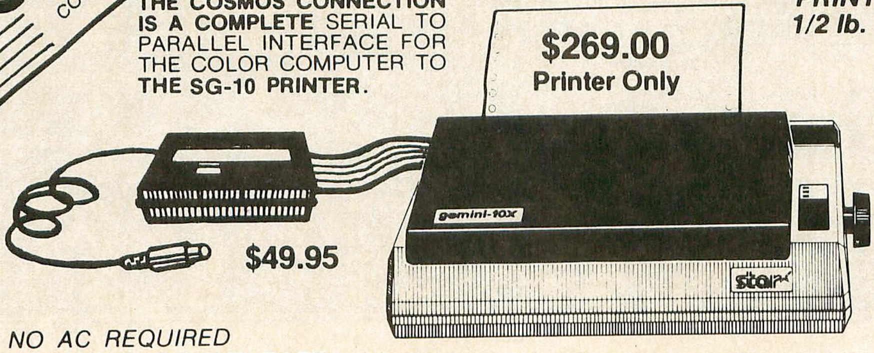
Enter the entire program, lines 1000 through 32180.

- To run *Scan Character Types*, type `RUN` or `RUN 1000` and press ENTER.
- To run *Compute Cost Ratios*, type `RUN 2000` and press ENTER.
- To run *Design Character Group*, type `RUN 3000` and press ENTER.

We'll look for you in the labyrinth!

DragonSmoke

We have started a monthly newsletter about new ways to learn, including computers, role playing games and play-by-mail games. For a free copy of the February 1985 issue, send a self-addressed, stamped envelope to *DragonSmoke*, P.O. Box 7627, Menlo Park, CA 94026.



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Determine The Fate Of Wandering Star

Soar, child, into the lands marked unknown on your charts. But beware those teachers who would ensnare you in guided discovery. They will guide you so you will learn nothing they do not already know — and that is too little for your questing, expanding mind.

— Laran Stardrake

By Bob Albrecht and Ramon Zamora
Rainbow Contributing Editors

"School Is In The Heart Of A Child" is for parents of quite young children. We want to help you work and play with your 3- to 8-year-old child and learn to use computers as a joyful family experience. We suggest ways to use the home computer as another means to encourage your child's independence, growth and control over his own life. See the pride on her face as she directs the computer to do what she selects with deliberation. See her head gears switch to "on" as she progresses step by step with your presence and caring guidance. We will explore (we hope, with your help) the following:

- Specific "teaching" techniques so the discovery can be the child's own.
- Critical evaluation of software based on extensive playtesting in family and related environments.
- Additional resources to consult: books, magazines, software publishers, networks, etc.
- Suggestions for interludes and fun times away from the computer (a must!): call the librarian for information; watch TV together and discuss it; work together as volunteers in a community project; take a winter awareness walk .
- Whatever we learn from families we work with in Menlo Park or from you, our readers. Let's pool our knowledge and share our experiences as we learn from our children.

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(Well-known author Bob Albrecht also writes the "Game Master's Apprentice" feature for THE RAINBOW *each month. Ramon Zamora is author and co-author of several books, co-founder of Computer Town USA!, and currently designing computer games for kids at Child Ware Corp. in Menlo Park, Calif.)*

We suggest you sign up for John Holt's newsletter, about teaching your own kids at home, entitled *Growing Without Schooling*. Requests can be sent to 29 Boylston St., Boston, MA 02016. Single issue for $2.50, six issues for $15, 12 issues for $27 and 18 issues for $30.

You can also buy books by John Holt and others by mail from the same people. We especially recommend the following books by John Holt: *How Children Fail, How Children Learn, Instead of Education,* and *Teach Your Own.*

In his book, *Instead of Education*, John Holt defines "S-chools," "s-chools," "T-eachers" and "t-eachers."

> "The schools for do-ers, which help people explore the world as they choose, I now call small 's' schools (written s-chools). The schools for educators, which get and hold their students by the threat of jail or uselessness or poverty, I now call capital 'S' schools, (written S-chools). There is very little we can do to make these S-chools better, and they are almost certain to get worse.
>
> "As places called 'schools' are on both sides of the line between doing and education, so are people called 'teachers' doing work called 'teaching.' On the doing side, people are helping do-ers do what they have freely decided that they want to do. On the education side, people are trying to make others learn what others have decided they ought to learn. I call the former action 't-eaching,' the latter 'T-eaching.'"

Wandering Star

Wandering Star wanders about the universe looking for cosmic oases that contain her favorite food, cosmic dust. When she finds a cosmic oasis, she wanders about it, eating any cosmic dust she finds.

Strange . . . a cosmic oasis looks just like a green TV screen when your CoCo is hooked up to it. Cosmic dust sometimes looks like points (.) scattered about the screen (oops! cosmic oasis). Wandering Star first appears near the center of the oasis, then rests for a brief time, perhaps thinking hungrily about cosmic dust.

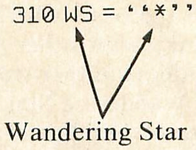
After her brief rest, Wandering Star wanders . . . right, left, up, down . . . looking for cosmic dust. If she meanders into a place that contains a cosmic dust mote, she eats it, then moves on.

Eventually, Wandering Star may reach the edge of the oasis and disappear. This usually happens long before she has eaten all the cosmic dust. When this happens, a mysterious message appears in the cosmic oasis: `FC ERROR IN 530`. What could it mean?

Listing 1:

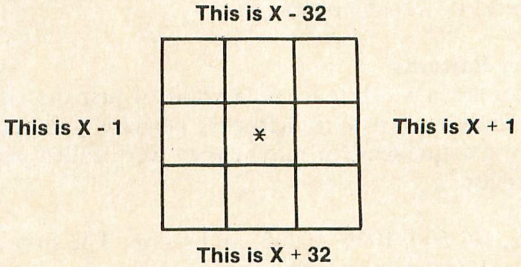
```
100 REM**WANDERING STAR SCH 12-1
110 CLS
199 '
200 REM**COSMIC DUST
210 CD$ = "."
220 FOR K=1 TO 100
230 PRINT @RND(510), CD$;
240 NEXT K
299 '
300 REM**WANDERING STAR APPEARS
310 WS$ = "*"
320 X = 240
330 PRINT @X, WS$;
340 FOR ZZ=1 TO 1000: NEXT ZZ
399 '
400 REM **RIGHT, LEFT, DOWN, OR
UP?
410 W = RND(4)
420 IF W=1 THEN XN = X + 1
430 IF W=2 THEN XN = X - 1
440 IF W=3 THEN XN = X + 32
450 IF W=4 THEN XN = X - 32
499 '
500 REM**WANDERING STAR WANDERS
510 PRINT @X," ";
520 X = XN
530 PRINT @X, WS$;
540 SOUND RND(255), 1
550 FOR ZZ=1 TO 20: NEXT ZZ
599 '
600 REM**GOTO DIRECTION SELECTOR
610 GOTO 410
699 END
```

Enter the program and run it. Cosmic dust appears (block 200) on a green screen (Line 110), then Wandering Star appears near the center of the screen and rests a short time (block 300). Wandering Star is represented by an asterisk (Line 310).



```
310 WS = ''*''
```

Block 400 computes a new screen position (XN) for Wandering Star. The new position is chosen at random from four possibilities. The following diagram shows Wandering Star in position 'X' and the four possible places for 'XN.'



Remember: There are 512 print positions on the screen, numbered 0 to 511. They are arranged in 16 lines with 32 positions in each line.

Aha! That explains lines 440 and 450.

Line 440: Add 32 to 'X' to move down one line.
Line 450: Subtract 32 from 'X' to move up one line.

And so we arrive at Line 510. This erases Wandering Star from where she now is in screen position 'X.' Then, in Line 520, the value of 'X' is replaced by her new position 'XN.' Line 530 prints her in the new position.

Trouble! If 'X' is less than zero or more than 511, the computer will stop with an FC Error in 530. Here is one way to fix that — we will try other ways later. Add the following lines to the program.

Listing 2:

```
525 IF X<0 OR X>510 THEN 710
599 '
700 REM**WS DISAPPEARS
710 BYE$ = "FAREWELL, WANDERING
STAR."
720 PRINT @0, BYE$: PRINT
730 PRINT "TO PLAY AGAIN, PRESS
THE SPACE KEY.";
740 K$=INKEY$:IF K$="" THEN 740
750 IF K$=" " THEN 110 ELSE 740
```

Now, if Wandering Star wanders out into the cosmic desert, we simply bid her farewell. You may wonder why we used 510 instead of 511 in Line 230 and also in Line 525. Printing in print position 511 causes the entire screen to scroll up one line. We don't want that to happen, so we avoid position 511.

Well, Wandering Star wanders and eventually wanders off the screen, never again to appear on-screen. Farewell, Wandering Star.

Alas, the part of the universe surrounding the screen is a cosmic desert. The screen, of course, is a cosmic oasis. After wandering in the desert for awhile, Wandering Star decided to return to the oasis where she can again savor cosmic dust and think about other oases elsewhere in the universe (and therein lies another story).

Think about how Wandering Star might return. She left the universe along one of the edges of the screen . . . hmmm, perhaps she could reappear somewhere at the edge of the screen.

Does she learn from experience? Will she soon disappear again into the desert? Or will she remain in the food-rich oasis, pondering the greater universe, then invent or discover a way to move beyond the cosmic desert into other (and different) oases?

Number Patterns

If you are a math teacher, a child of just the right age, or an adult with a long memory, perhaps you remember geometric sequences (or maybe they were called geometric progressions).

A) 1, 10, 100, 1000, 10000, and so on. The first number is 1. After the first number, each new number is obtained by multiplying the preceding number by 10.
B) 1, 2, 4, 8, 16, and so on. The first number is 1. After the first number, each new number is obtained by multiplying the preceding number by 2.
C) 3, 6, 12, 24, 48, and so on. The first number is 3. After the first number, each new number is obtained by multiplying the preceding number by 2.
D) 1, -2, 4, -8, 16, and so on. The first number is 1. After the first number, each new number is obtained by multiplying the preceding number by -2.

The basic idea is the same as last time. We start with a number. We do something to that number to get the next number. We continue doing the same thing to each old number to get a new number. Here is our second number patterns program.

Listing 3:

```
100 REM**NMBR PATTERNS SCH 12-2
199 '
200 REM**GET PATTERN NUMBERS
210 CLS
220 PRINT @480,;
230 INPUT "FIRST NUMBER ": S
240 INPUT "MULTIPLIER   ": A
250 PRINT: PRINT
299 '
300 REM**SHOW 'LATEST' NUMBER
310 PRINT @448, S
320 PRINT
399 '
400 REM**COMPUTE NEXT NUMBER
410 S = S * A
499 '
500 REM**TELL WHAT TO DO NEXT
510 PRINT @480, "FOR NEXT NUMBER
, PRESS spacebar"
520 PRINT "TO START OVER, PRESS
clear KEY";
530 K$=INKEY$:IF K$="" THEN 530
540 IF K$=" " THEN 310
550 IF K$=CHR$(12) THEN 210
    ELSE 530
599 END
```

Enter and run the program. It might go like this:

```
FIRST NUMBER        ? 1
MULTIPLIER          ? 10
1
FOR NEXT NUMBER, PRESS SPACE BAR

TO START OVER, PRESS CLEAR KEY
```

Reverse color

Reverse color

Press the space bar and see the next number.

```
FIRST NUMBER        ? 1
MULTIPLIER          ? 10
1
10
FOR NEXT NUMBER, PRESS SPACE BAR
TO START OVER, PRESS CLEAR KEY
```

Guess the next number, then press the space bar. Did you guess the CoCo's number? Is this an educational activity? A drill? A game?

Caution: These numbers can get big very fast and suddenly you see a floating point number.

1E+09	means	1000000000
1E+10	means	10000000000

The CoCo will print whole numbers up to 999,999,999 without flipping into floating point, but show bigger numbers in a "shorthand" called floating point. We suggest you stop the pattern guessing when the CoCo begins printing in floating point.

We suggest you and a kid or two try some of the following patterns together.

First Number	Multiplier	Pattern
1	2	1,2,4,8,16, and so on
3	2	3,6,12,24,48, and so on
5	5	5,25,125,625, and so on
1	-1	1,-1,1,-1,1, and so on
10	2	10,20,400,8000, and so on

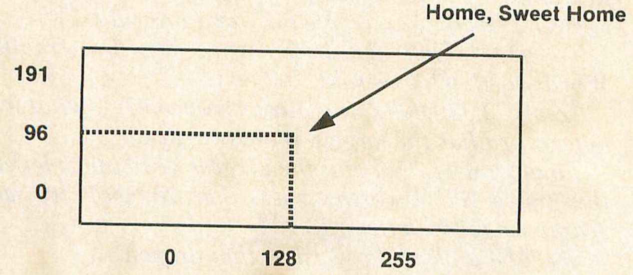
To prevent floating point numbers from appearing, change block 300 as follows.

Listing 4:

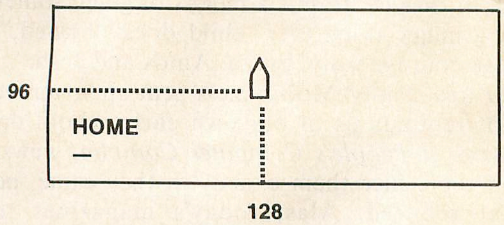
```
300 REM**SHOW  'LATEST' NUMBER
310 IF S<1E+09 THEN PRINT @448,S
 ELSE PRINT @448, "OOPS! NEXT NU
MBER IS TOO BIG FOR ME. PLEASE S
TART OVER."
320 PRINT
```

Color LOGO

Telli's home is near the center of the screen.



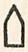
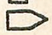
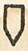
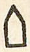
To tell Telli to go home, type HOME and press ENTER. You will see her in her home position near the center of the screen. She faces toward the top of the screen.



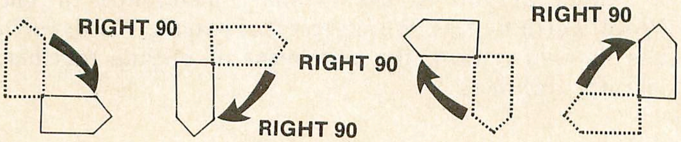
Remember the difference between HOME and CLEAR.

- — CLEAR clears the screen and sends Telli home. Only the turtle and the cursor remain on-screen.
- — HOME sends Telli home without clearing the screen.

You can tell Telli to turn to the right or to the left. Try some right turns.

Type this	**And Watch Telli**
CLEAR or HOME	
RIGHT 90	
RIGHT 90	
RIGHT 90	
RIGHT 90	

The command RIGHT 90 tells Telli to turn 90 degrees to the right. After four RIGHT 90 turns, she is back where she began with her nose pointing toward the top of the screen.



Telli can also turn left. Try these commands and watch Telli.

```
CLEAR
LEFT 90
LEFT 90
LEFT 90
LEFT 90
```

Telli says, "You can use abbreviations for left and right."

- — Use LT for LEFT
- — Use RT for RIGHT

Experiment: Try some left and right turns. Try some of these:

RT 45 or LT 45 or RT 270

RT___ or LT___

You choose the numbers.

More Wordsworth Letters

We love the letters. Here are more letters from families who play together and learn together solving our Wordsworth challenges. Our first letter is from Kris Hansen and daughter Lara. We especially like this letter because it says better than we could what Wordsworth is all about.

> *Thanks for your terrific column! The August issue was our first issue of* THE RAINBOW *and we were delighted when we found "School Is In The Heart Of A Child." This is just what a parent needs — a way to show young children that the computer is a tool that can be used to make a hard job easy, in addition to all the fun things we already know a computer can do.*
>
> *Lara is 7 years old. She typed the two Wordsworth programs in herself and saved them on her own cassette tape. We used the* MacMillan Dictionary for Children *to hunt for words, but "abracadabra" wasn't in it. We had a lot of fun working on this together and are looking forward to seeing if you will have other projects for helping us learn to use our CoCo. Here are Lara's answers to the Wordsworth question.*

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	YIELD	-54,000-
Q4	— ABRACADABRA	-15,552-

Thanks, Kris and Lara. We especially like the part that says "This is just what a parent needs — a way to show young children that the computer is a tool that can be used to make a hard job easy." Yes, we will try to create more fun programs to help you use your CoCo!

Amos and Josh Goldie are next. We suspect your nickname for your dad is a term of endearment, whereby you acknowledge his brilliant, but laid back, help as you researched your answers. We enjoyed the salutation in your letter!

To Whom It May Concern:

We read your article, "Letters, Books, and Dreams of the Future" in the "Wordsworth" section (RAINBOW, August '84) and liked it very much. We also noticed your contest and decided it would be a fun thing to do. I (Amos) with my brother, Josh, and my dad (usually referred to as "dummsy") stayed up late one night and completed all four questions.

Here are our answers:

For #1, "What magic word has a Wordsworth #1 equal to the number of weeks in a year? (52)," we got three answers: "tram (52), create (52), and braved (52)."

To #2, "What five-letter word has the smallest Wordsworth #2," we said "babka (44)."

"Zloty (2,340,000)" was our answer to #3, "'What five-letter word has the largest Wordsworth #2?"

Finally on #4, "What is the longest word (most letters) that has a Wordsworth #2 less than 20,000?", we said, "carapace (eight letters, 12,960)."

We'll be looking forward to that dragon.

Magic Words, indeed! We had "abracadabra" in mind. The real magic is what happened when you searched and found words to meet our challenge. Your words do have the touch of magic: "tram," a means of going somewhere; "create," a magic thing every child does; "braved," faced a challenge courageously. Bravo, Amos and Josh.

Andrea and Jenny McGuinness sent their answers on paper that reminds us of our own early school days. In the old days of *People's Computer Company* newspaper, we would reproduce them exactly as they came, perhaps somewhat reduced. Alas, today's magazines require everything to be condensed into the smallest possible space — thus removing much of the human touch of yesteryear. So here are Andrea's and Jenny's answers, without the delight of their handwritten originals.

1) What magic word has a Wordsworth #1 equal to the number of weeks in a year? Both Andrea and Jenny say: Abracadabra
2) What five-letter word has the smallest Wordsworth #2? Andrea says Abase and Jenny submits Aback.
3) What five-letter word has the largest Wordsworth#2? Jenny declares "Zippy is the word." Andrea demurs, and counters with "Zesty."
4) What is the longest (most letters) word that has a Wordsworth #2 less than 20,000? Both young ladies suggest seven-letter words, with Jenny favoring "Abroach" and Andrea insisting on "Abraham."

Thanks, everyone. We won't pick a "winner." There is already too much competition in the world. We will send a stuffed dragon to every family mentioned in The Wordsworth Letters. We suggest that playing Wordsworth has its own reward, the enjoyment of playing together, learning together.

DragonSmoke

We will publish a little newsletter called *DragonSmoke*. It will start small and perhaps grow. As it grows, it will include COPY ME stuff, public domain instructional materials, and software for beginners. For a free copy, send a self-addressed, stamped envelope to DragonSmoke, P.O. Box 310, Menlo Park, CA 94026.

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An Introduction To Spreadsheets

By Richard A. White
Rainbow Contributing Editor

After writing about BASIC for over two years, it is time for a break. For the next several months we will concern ourselves with what is, in fact, a language, and perhaps a higher level language than BASIC. This is the spreadsheet program.

Spreadsheets are fairly new in computing history. *VisiCalc*, the first, was invented by Daniel Bricklin and Robert Frankston. The incentive for its invention was Bricklin's frustration with the accountant's pencil and paper that he had to work with in business school. Bricklin viewed *VisiCalc* as a program to facilitate accounting by easing the data entry and letting the computer do the calculations.

As with all good programs, users found more and better uses. One of the first out of the box was using the program to make "what if" business projections. A good spreadsheet can be considered a simulation kit with many uses, some of which are still to be discovered.

A spreadsheet can be used as a simple text editor since the cursor can be easily moved around the sheet to any desired cell. A spreadsheet can also be a database manager with a sort function to re-order records. Some spreadsheets even have a search function to locate a specified character sequence that may appear one or more times in the spreadsheet contents.

The spreadsheets we will talk about are organized into a rectangular array of cells. Cells are addressed by a one- or two-letter column identifier and a row number. The cell in the third row of the first column is "A3."

The user has total control of what goes into each cell. A cell may contain a number, a string or label or a formula that draws on data in other cells to generate the contents of the cell. I said generate rather than calculate since some spreadsheets can use formulas to select strings to appear in the cell.

Finally, formatting commands can be used to control how the data is shown in a cell or groups of cells. For example, numbers may be formatted as integers, in dollar format (e.g., $10.00) or in a number of other ways. Strings may be left-justified, right-justified or in more powerful spreadsheets, centered in a cell. And, when you go to print the spreadsheet, it's literally "what you see is what you get."

If you are thinking these types of capabilities are neat, many, many others have, too. And they will pay up to $500 for spreadsheet programs. *VisiCalc* initially sold for $200 and not only sold programs, but sold $2000 computers to run the program. The Apple II was a principal beneficiary, but buyers are fickle creatures with little loyalty. The IBM PC arrived and not long after a *VisiCalc* appeared for it. But, Mitch Kapor and his programmers were brewing trouble in the form of *Lotus 1-2-3*, which has coined about $100,000,000 in a year and a half. *VisiCalc* was caught with its enhancements down and is just a shadow on the market.

All this relates to bigger computers than the CoCo. We have had spreadsheet development as well, even if it does not draw "Silicon Valley" limelight. THE RAINBOW was just a toddler when Radio Shack brought us the *Spectaculator* ROM and the excitement among us old-timers was indeed great. While hardly a *VisiCalc*, it did many jobs well and

(Richard White has a long background with microcomputers and specializes in BASIC programming. With Don Dollberg, he is the author of the TIMS *database management program.)*

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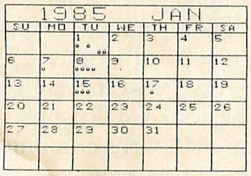

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		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

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```
  1
 43
+69
102
1+4+6=11
```

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ALL LISTED PROGRAMS

was only $49.95. It also departed from the *VisiCalc* command methods which did not seem important at the time. *Disk Spectaculator* is similar to the ROM Pak version with a few enhancements.

The first RAINBOWfest was in Chicago in 1983 and there *Elite*Calc* was introduced with much acclaim. My *Spectacular* ROM Pak went onto the shelf and has been there since. *Elite*Calc* won me over with Copy and Move, Lookup tables, If . . . Then . . . Else, better formatting and better printer control. So my spreadsheet investment was up to $120.

It was not to stop there. *DynaCalc* plucked another $100 from my pocket. But, I have three spreadsheets rather than one *VisiCalc*, and with *DynaCalc* I have some neat graphing abilities that are missing in *VisiCalc* and speed in areas where speed counts.

This is one reason I have drawn the line and not bought *VIP Calc*. *VIP*'s screen handling and calculating are so slow, while *DynaCalc* is speedy. On the other hand, *DynaCalc* will print a spreadsheet and that's all in that department, while *VIP Calc* has all sorts of "specialties" but lacks the graphing *DynaCalc* has, along with the ability to do a high resolution screen dump of the graph to many printers.

Which brings us to the 59, 69, 99 or 149 dollar question. If you want to buy a spreadsheet to use as you follow this series, what should it be? If you have a disk drive and 64K, you could go for *DynaCalc* running under CoCo DOS, not OS-9. But, the people at VIP Technologies, formerly Softlaw, would like to sell you *VIP Calc* along with their five other utilities, *Disk-Zap*, *Speller*, *Database*, *Writer* and *Terminal*, for only $149 in an "integrated package." Since the *Writer* and *Terminal* rank among the best in their respective areas, it's a tough package to turn down. The *VIP Integrated Library* is available from local dealers who handle CoCo software or by express order from any Radio Shack store.

If you have a tape-based system, the choice is much tougher. *VIP Calc* comes with tape and disk, and has the high resolution text screen. *Elite*Calc*, purchased either on tape or disk, uses the standard CoCo text screen, but is fast, easy to use and well-debugged. As one owner of the four CoCo spreadsheets observed, if the best features of each were combined into one program, near perfection would be achieved. I expect the serious spreadsheet user will end up with a number of programs to meet a variety of needs.

Whatever you buy will give you a major increase in the usefulness of your CoCo. Granted, you can do anything with a BASIC or PASCAL program that you can do in a spreadsheet, although working with a spreadsheet is much quicker and easier.

We are all used to dealing with forms, though we may not like to. A form serves to organize information in a specific way and may include instructions for processing that information for inclusion in other places on the same form.

Income tax forms are probably the best and most widely known (and maybe most disliked) example. Forget the pain of your money going to support programs you may not

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believe in, the time spent finding all those pieces of paper with the data needed for the income tax forms only to find that things are still confusing and troublesome. The calculations are fairly simple, consisting only of addition, subtraction and multiplication, but they must be right, which means checking and rechecking. Then there are the choices.

Here are some choice calculations from Schedule G (Form 1040) "Income Averaging."

15. Multiply the amount on line 14 by 25% (.25).
16. Write in the amount from line 7 above.
17. Add lines 15 and 16.
18. Write in the amount from line 11 above.
19. Add lines 17 and 18.
20. Tax on amount on line 19 (from Tax Rate Schedule X, Y, or Z).
21. Tax on amount on line 17 (from Tax Rate Schedule X, Y, or Z).
22. Tax on amount on line 16 (from Tax Rate Schedule X, Y, or Z).

Is this sounding more like computer work than people work? Would it be a lot of work to program in BASIC or some other high level language? Not only would you need to write code to do the calculations, but you would need to write `PRINT` routines to display the results so the user could transfer the results to the tax form to keep the IRS happy. And what about editing the data after it is input? Now there is a real can of worms.

While a spreadsheet does not remove the need to understand the task and write formulas to implement it, presentation of results and ability to edit data are integral to the spreadsheet such that the programmer need give these little thought. And the actual programming is easier.

Cells replace variables so the abstraction of some two character name is replaced by some X-Y location that can be labeled with real words and reviewed by scrolling through the spreadsheet under arrow key control. Further, a formula is written into a cell and the results of its labors are shown in that cell.

As one example of spreadsheet programming speed, I developed a Schedule G (Form 1040) spreadsheet in *Elite*Calc* with about six hours of work. To make the sheet fully general, it needs to calculate tax values based on four tax schedules (Schedule Y has two versions) for values from five different lines in the form.

The total Schedule G file uses over 10,000 bytes. About a third of this is *Elite*Calc* overhead, while the remainder is labels, data and formula.

Now I will grant you that having already written the tax calculations into Form 1040 and 1040A spreadsheets, I knew just what I needed to do. Still, to program and debug this in BASIC would have taken over twice as long. If you are reading this in March 1985 and feel the hot breath of April 15th down your neck, you can buy a package of eight income tax spreadsheets, including those mentioned above from Elite Software Users Group, Box 683, West Fargo, ND 58078, phone (701)281-0549. These are for disk *Elite*Calc* and cost $19.95 by check or money order.

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While big, powerful spreadsheet programs can be fun and impressive, let's first talk about a very simple example. Enter four numbers to be added. We will put them in a column using cells A1 to A4.

```
  :    A    ::    B    ::    C    :
1    42.00
2     7.00
3    27.80
4   100.09
5  ---------
```

To enter the numbers, the user moved the cursor to each cell in turn and typed the number that is in that cell. The spreadsheet added zeros after the decimal as needed to provide the normal .XX default presentation. Individual cells or groups of cells can be formatted to change this. The row of dashes in A5 is a string of dash characters. The simplest way to add the numbers is to put the formula A1+A2+A3+A4 into A6. As long as the spreadsheet is in the automatic calculation mode, the answer immediately appears.

```
  :    A    ::    B    ::    C    :
1    42.00
2     7.00
3    27.80
4   100.09
5  ---------
6   176.89
```

Now, you could move the cursor over any of the cells A1 to A4, type a different number from that in the cell and immediately see the corrected total. A spreadsheet will support all arithmetic operations that are supported by BASIC.

Those numbers look sort of arbitrary. We can add labels to add meaning.

```
  :        A         ::    B    ::    C    :
1 PAID TO:             CHECK #     AMOUNT
2 WATER WORKS          2145.00       42.00
3 NEWSPAPER            2146.00        7.00
4 TELEPHONE            2147.00       27.80
5 RADIO SHACK          2148.00      100.09
6                                 ---------
7 TOTAL                             176.89
```

First, I inserted two new columns to the left of old Column A. This moved the data and total into Column C. It did not need to be retyped. Next, Column A was widened to 18 characters. Within some limits, column widths can be adjusted as you choose. Next, a new row was added at the top and the labels which are strings of characters were typed into Row 1 cells and cells A2-A5. The check numbers in Column B were entered as numbers and appear in the default format having two decimal places justified to the right. In the default case, labels justify to the left.

In some ways, our spreadsheet just does not look as neat as it could. The decimal point and zeros on the check

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numbers aren't right. Check numbers should be integers and it would be nice for them to line up under the Check # heading, so let's retype them as labels. Also the Amount heading would be nicer if it were right-justified over the column of numbers. That is easily done by formatting cell A3 to right-justify the text.

Here is the final result.

```
  :        A         ::    B     ::     C     :
1 PAID TO:              CHECK #        AMOUNT
2 WATER WORKS           2145            42.00
3 NEWSPAPER             2146             7.00
4 TELEPHONE             2147            27.80
5 RADIO SHACK           2148           100.09
6                                   ---------
7 TOTAL                                176.89
```

To current spreadsheet users, this is a trivial example. Many non-spreadsheet owners have only the foggiest notions of what a spreadsheet is. Perhaps even this simple example will demonstrate how powerful the simplest operations can be.

Now I have talked grandly about typing in numbers and labels, inserting columns and rows, putting a formula into a cell and reformatting cells as if it were as easy as buttering bread; it is, almost. However, there are a couple of different approaches used by different spreadsheets that bear discussion, since this may influence which spreadsheet you buy.

First, there is the *VisiCalc* method that is also used by *VIP Calc*, *DynaCalc* and *Lotus 1-2-3* on IBM PC-type machines. Here, the spreadsheet is normally in the "entry" mode and is looking for a number or a label. If the first character typed is a number, it expects the rest of the entry will be a value. If the first character is a letter or some other non-numeric character, with a few exceptions, it assumes the remainder of the entry will be a label. How, then, did we enter a check number as a label? Simply tell the program a label is coming by typing a single quote, SHIFT-7 and then whatever characters we want in the label. In this case, it was a string of numbers.

To enter a formula or expression, one of several operators must appear as the first character. We really need to remember two, '+' and '@.' In the example above, +A2+A3+A4+A5 enters the formula that totals the amounts. However, this is a messy and memory-wasting way to tell the program to add if 20 or 30 cells in a column or row are involved. All spreadsheets provide a selection of arithmetic functions. A basic one is SUM(X . . . Y) that will add all values in cells 'X' to 'Y.'

In a *VisiCalc*-type sheet, the @ symbol as the first character clues the program that an expression using a function is coming next. Typing @SUM(A2 . . . A5) does the same job as +A2+A3+A4+A5.

We must be able to escape the entry mode to do such basic things as save or print our spreadsheet, as well as do all the other neat things like changing cell formats, adjusting column widths and many more. Striking the slash key will call up the main program menu.

In a memory-eating, 80-column display program such as *Lotus 1-2-3*, the menu is displayed as a series of single words at the top of the screen. The words are generally selected so each starts with a different letter and the user can select the desired function or submenu by typing a single letter. Submenus work the same way. In *DynaCalc*, only the single letters are displayed. In both cases, typing a question mark will get one or more Help screens that elaborate on the choices.

Up to this point, we see a number of programs working in a standard manner. Now, that uniform approach starts to break down. *DynaCalc* maintains close similarity to *VisiCalc* in that the examples in the book *VisiCalc Applications* (Radio Shack Cat. No. 62-1051) work with very few changes. You may never need an "Accounts Receivable" spreadsheet, but that example is worth trying in *DynaCalc* or *VIP Calc* just to learn a few ways to manipulate data and expressions.

Lotus 1-2-3 has so many added features that there are submenus up to four deep. Here the problem is learning the new things more than unlearning what you might know from *VisiCalc*, *DynaCalc* or *VIP Calc*.

*Elite*Calc* exemplifies the alternate approach where the program is normally in the command mode and ready to accept single letter commands. The program must be told that a label is coming with a double quotation (") that applies to a single cell entry, or a 'T' that puts the program into Text Lock so it accepts only text until the BREAK key is pressed. Any number signals that a value is coming, while an equal sign indicates "here comes an expression or formula."

Seemingly, it should be a bit easier to learn *DynaCalc* or *VIP Calc* at home and then pick up *Lotus 1-2-3* at the office than to start with *Elite*Calc* and then learn *Lotus*. Actually, the basic concepts in spreadsheets are what is important and the command implementation differences are fairly minor.

As with any programming language, the documentation provided cannot begin to describe or even imply all the ways each of the functions can be used. In some respects, the bigger the book, the more obscure and confusing it becomes. The Help screens in *Lotus* are much better at getting to the heart of the user's basic needs than is the documentation.

In subsequent months, we will continue to introduce concepts and uses to help you understand and use a spreadsheet. However, hang onto the documentation for your spreadsheet and become familiar with it so you can quickly refer to the exact syntax or usage that your sheet requires.

If you are considering which spreadsheet or sheets to buy, remember that *Lotus 1-2-3* and *VisiCalc* are not available for the CoCo. The others mentioned are available and are well-described in advertisements in THE RAINBOW. These ads may be referenced through the "Advertiser's Index" in the back of the magazine by the manufacturer's names and not by the program names. *DynaCalc* is published by Computer Systems Center, *Elite*Calc* by Elite Software and *VIP Calc* by VIP Technologies, formerly Softlaw Corp. The versions of *Spectaculator* may be seen and tried at any Radio Shack Computer Center and at many Radio Shack stores.

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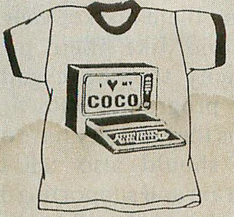

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Available in Adult Sizes
S, M, L, XL, and Youth L (14-16)
White with Red Trim
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TREAT YOURSELF OR A FRIEND
TO A GREAT GIFT.
CALL US FOR DETAILS
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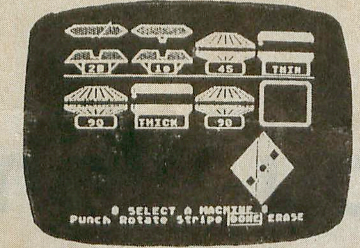

The Factory: FROM SUNBURST
Strategies in Problem Solving

Grades 4-adult. Winner 1983 Learning Software Award. Recommended in Classroom Computer Learning, Courseware Report Card and Electronic Learning Unique three-level program challenges students to create geometric "products" on a simulated machine assembly line which the student designs. Diskette for 32K TRS-80 Color Computer with Extended Color BASIC. $39.95

The Pond: FROM SUNBURST
Strategies in Problem Solving

Grades 2-adult. Winner 1983 Learning Software Award. Recommended in Classroom Computer Learing. A small green frog, lost in a pond of lily pads, helps students recognize and articulate patterns, generalize from raw data and think logically. Diskette for 32K TRS-80 Color Computer with Extended Color BASIC. $39.95

STRANDED 32K EB
$24.95 DISK ONLY
A fully graphic adventure in which you are an astronaut stranded on the moon. Your space ship cannot be repaired and you must get back to earth. Inventory displayed on screen at all times. Save and reload at any time. Map included, if you wish to use it. An entertaining way to improve critical thinking.

VERBAL MATH PROBLEMS

PIZZA GAME 32K EB. $19.95
Learn to locate coordinates on a grid. HI-RES text and graphics.

AREA & PERIMETER
32K EB. $19.95
Triangles, rectangles, and circles are covered in this HI-RES text and graphics program.

SALES & BARGAINS
32K EB. $19.95
Learn to find the discounted price. HI-RES text and beautiful graphics.

DISTANCE PROBLEMS $19.95
Moving graphics and text combines on a hi-res screen. Rate x Time = Distance in all its forms.
32K E.B.

SCIENCE GAME $29.95
by J. Keeling 32K EB. Disk Only
Over 600 questions in 9 categories. Makes learning science facts fun. Game format, 1 or 2 players, teams. Grade 8 and up.

5 LIGHTPEN PROGRAMS
32K EB $44.95
Five menu driven educational programs designed for children grade 1 and 2, and special educational students. Basic addition, basic multiplication, shape series matching, number series matching and word rhyming are included. All on a hi-res screen, with graphics. User need only to use the light pen to operate the programs. Light pen included.

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TRS-80 Color Computer. TDP System 100.

The second of a two-part series

So, You Want To Sell Your Software . . .

By Susan P. Davis

Last month, we talked about selling your software. In order to make the best decision, you also need to know what is involved in having an established software house market your software.

We will talk about what the company should be expected to do for you, and also what they will expect from you in return.

What should be looked for when choosing a company you would like to have consider your program? A little research will be necessary. How long has this company been in the business of selling Color Computer software? Are they constantly expanding their product line? Some excellent companies have only a few superior products; others have a wide range of products. Which one of these marketing philosophies fits in best with your program? Does the company have instant name recognition within the Color Computer world? How soon will this company be able to get your product on the market?

What kind of payment plan does the company have? Some software houses purchase software for one lump sum. Others pay royalties ranging from about 20 to 30 percent — the actual percentage depends on many factors. There are step-up royalty plans, where the amount of royalty paid depends upon the level of sales in any given time period.

Each of these payment plans has its merits as well as its disadvantages. You might do better with a 5 percent royalty from Radio Shack than a 30 percent royalty from John Doe's Crazy Color Computer Company.

Select a few software houses whose products you like and try to get these questions answered. Most companies are glad to review good software and should be willing to talk to you about their policies. Others may have their own staff of in-house programmers and do not seek outside submissions. This should be part of your research.

To start, you might send a letter of introduction to the company in which you are interested. A phone call would also accomplish your objectives. You should be prepared to tell the company why you are particularly interested in having them market your program (i.e., use and like their products, good publicity they have gotten, how well your program would fit in with programs they already have on the market). You should also tell them if your program and supporting documentation is complete or still in the development stages.

What can you expect from the software house after you have made this initial approach? You should get a response, either written or verbal, indicating interest or lack of interest in your program. If the company is not interested in your program or your ideas, there will be no further communication.

If they are at all interested, they should let you know what their policies are, the percent of royalties they pay, what programming assistance they are willing to give you and an idea of how long it takes them to get a program market-ready. If they do not offer to send you a software submission agreement, you should ask about one. At this point, you should make arrangements to send an evaluation copy of your program and documentation to the software house.

(Susan Davis has a master's degree in linguistics and has taught Spanish on the high school and college levels. She is also a CLU with seven years experience in the life and health insurance fields. In addition, she designs educational programs for Sugar Software, which she owns with her husband, Gary.)

It is not a good idea to mail an unsolicited program directly to a software house. The chances of it getting reviewed are much worse if you do. You should also not send your program to more than one software house at a time.

Soon you should receive a "Software Submission Agreement" from the software house. This document is designed to protect the legal rights of the software house, and was probably written by an attorney. You should read it carefully and make sure you understand its contents before signing it and returning it to the software house with your program. You might want to have your own attorney review the document with you.

Here are some of the provisions and statements that may be contained in your Software Submission Agreement: You agree that the program is being submitted for evaluation purposes only. You have the legal right to submit the software — you are of legal age (or your parent is willing to sign the agreement), you are legally competent, you are the sole author or the co-author (all co-authors must sign and agree) of the software, and that you have the full and exclusive right, title and interest in the software.

The software you are submitting must also meet some legal qualifications. Your software may not infringe on any copyright, trade secret, patent or other intellectual property right and the software must not be in the public domain.

You must understand that this software submission does not create a confidential or fiduciary relationship between you and the software publishing house. The company can market products or services that compete with your product. They may also use, publish and market similar software that they independently develop or obtain from others.

Suppose you have submitted your program and the software house wants to publish and market it. Congratulations! You both will need to decide if this will be an outright purchase or if they will market your program on a royalty basis.

If the software will be purchased outright, you will need to sign a "Software Purchase Agreement." Again, this is a legal document and you may want your attorney to review it with you before signing.

The rights and obligations of the author should be spelled out. If a bug is later discovered in the program, who will be obligated to fix it? Is there a time limit on this or any other obligation of the author? The rights and obligations of the publisher should also be spelled out. Who will hold the copyright? The purchase price of the software, the terms of payment and the delivery date of the software should be carefully written out. There may be other provisions in this document as well.

If your program will be sold on a royalty basis, you will need to sign a "Software Licensing Agreement." This agreement will be drawn up by the software publishing company. Again, it is probably a good idea to review this document with your attorney before signing it.

The first part of the document will probably be full of definitions so the language of the provisions that follow will be more clear.

". . . You both will need to decide if this will be an outright purchase or if they will market your program on a royalty basis."

The delivery of the program will be part of the agreement. Items specified will include the delivery date and the items which the software house needs: source code, tape version, disk version and documentation may be included.

There will be provisions regarding acceptance testing. Does the final version of the program do everything it is supposed to do? There will also be an opportunity to review the program documentation and the user documentation. The software publishing company will then deliver a notice of acceptance or non-acceptance of the program as delivered.

There will be a part about the author's duty to correct. This will define your responsibilities in case bugs are found in your program or if updates need to be made. This may be similar to the part relating to program maintenance. The obligations of both the author and the publisher should be defined.

There will also be a section specifying the grant of rights from the author to the publisher. What is the duration of the license agreement — permanent? one year? etc. The location of the license will be spelled out — worldwide? the United States and its territories? What specific rights does the publisher have — manufacture, reproduce, publish, etc.? The ownership of the copyright, trademark, patent, etc., will also be covered in this section.

The royalty provisions will be most important. What is the royalty percentage? Is it based on gross sales or net sales? How are retail and wholesale royalties figured? Is the amount of the royalty based on any minimum number of sales per time period? When are the royalties payable? What remedies are available to you if you question the publisher's figures?

The author makes certain warranties in this agreement relating to the authorship and ownership of the program. You will probably see provisions where you agree to "hold the publisher harmless" from any loss, expense, damage or liability resulting from a breach of the representations and warrants upon which the publisher based its decision to market your program.

Either you or the publisher may wish to include sections dealing with marketing strategies, author's copies, accounting and audits, or any other provision that is important in your particular situation.

The publisher may require that you not publish a competing work with another software house.

General contract provisions, including assignment, the state and county of origin of the contract and limitations may also be included.

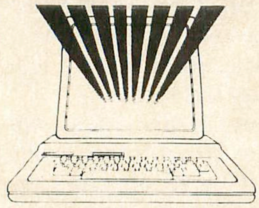
You should be able to get copies of these contracts and agreements at the time you request the Software Submission Agreement. That will help you decide if you want to submit your program to that particular software house.

By now, you should have all the information you need in order to make an informed decision about the marketing of your program.

Your personality, the amount of time you have available, your ability and willingness to handle the bookkeeping, customer relations, tax and other business aspects of selling software should be honestly evaluated.

Either way you go, it is a great feeling to see your program on the shelves of your local computer store!

GREAT COCO PRODUCTS



SUPER SCREEN

The Color Computer Supercharger

- A big 52 character by 24 line screen
- 'PRINT @' is fully implemented on the big screen
- Easily combine text with hi-res graphics
- Auto-key repeat for greater keyboard convenience
- The 'ON ERROR GOTO' statement is fully implemented
- Control codes for additional function

Super Screen comes with complete, well detailed instructions and is available on cassette or disc. It adjusts automatically to any 16K or greater, Extended or Disc basic Color Computer or TDP-100 and uses only 2K of memory in addition to the screen memory reserved during power up. Guaranteed to be the most frequently used program in your software library...once you use it, you won't be without it!

Hot CoCo, Jan. '84 *"Super Screen represents a quality utility program that fills a definite need for the serious CoCo user. No other programs on the market so far have offered the error-trapping utility of Super Screen."*
Color Computer Magazine, May '84 *"Super Screen is a worthy addition to anyone's software library. It has become my most used utility and has made programming in BASIC on the Color Computer a joy..."*

Cassette $29.95 **Disc $32.95**

NEW!

EASY-FILE

Data Management System

- Need a good mailing list or customer list program? How about a program to keep track of your investments, your computer magazines, or record collection? Do you have an inventory of all household items for insurance purposes? **EASY-FILE** will do all of these things and many more.
- **EASY-FILE** makes data managing a breeze with single key menu selections, extensive error handling procedures, a demonstration data file and a detailed, easy to understand instruction manual.
- **EASY-FILE** is powerful, too. It automatically enhances your monitor screen to a full upper and lower case, 51 character by 24 line display. **EASY-FILE** allows up to 30 data fields and provides password file protection, selectable numeric totalling and complete data searching and editing capabilities. You can quickly enter, locate, review and modify data records, and even transfer records from one file to another.
- Sorting? You bet! **EASY-FILE** allows you to sort up to 5 levels of data and allows you to define upper and lower limits as well. You can sort in many different ways and save the results in individual index files. These index files may be used later to determine what will appear on your printed reports.
- Reports are easily prepared with **EASY-FILE** because it offers so many automatic features. There is no need to generate complex report forms. With **EASY-FILE** you simply select from a list of options to determine what your report and header will look like. There are countless variations. **EASY-FILE** takes care of tab stops and field spacing automatically. Prepare horizontal reports (80 or 132 columns), vertical reports or labels! Save your favorite report formats right in a data file so they may be used *whenever you* need them.
- The **EASY-FILE** master disc and instructions are packaged in an attractive 3-ring binder. Requires 32K and at least one disc drive.

Order yours now! Get organized for only $59.95!

UNIVERSAL VIDEO DRIVER

Carefully engineered to work with **ALL** Color Computer models, including the new **COCO II**

ENABLES YOUR COCO TO OPERATE WITH A VIDEO MONITOR INSTEAD OF A TELEVISION!

- Works with Monochrome Monitors!
- Works with Color Monitors!
- Audio Connection Included!
- Easy Installation—No Soldering!
- Great Price! **ONLY $29.95**

ORDER ENTRY SYSTEM

Rainbow, Feb. '84 *"If you are looking for a program to keep track of your sales and print invoices, then this one will take care of those needs quite well...A good program that would serve the invoicing needs of a small company quite nicely."*

The Mark Data Product sales order processing system provides a fast, efficient means to enter orders, print shipping papers and invoices, prepare sales reports, and monitor receivables. The system automatically enhances the monitor screen to a 51 character by 24 line display. 32K of memory is required along with an 80-column printer and one or more disc drives.

The MDP Order Entry System is a family of programs which operate interactively by means of a "menu" selection scheme. Up to 900 products may be defined and a single disc system can hold over 600 transactions. When the operator selects a task to be performed, the computer loads a program designed to handle that task from the system disc. The system disc contains all of the programs required to create, update and maintain data files and prepare the necessary paperwork including shipping and invoice forms, daily sales reports, a monthly (or other period) sales report and a receivables report.

This order entry software equals or exceeds higher priced packages for other computers and includes a detailed operating manual. **ONLY $99.95**

SUPER PRO KEYBOARD

ONLY $64.95*

- Original key layout
- Fast, easy installation—no soldering
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- Smooth "Touch Typist" feel—no sagging
- U.S. made—high quality, quad gold contacts
- Professional, low profile, finished appearance

* Computers produced after approximately October 1982 require an additional keyboard plug adapter. Please add $4.95.

ACCOUNTING SYSTEM

Rainbow, May '84 *"Considering what it can do to organize a small business, it is quite a value."*

Hot CoCo, June '84 *"...a serious, professional accounting program and well worth its price. The programs are complete and simple to use."*

The Mark Data Products Accounting System is ideal for the small businessman needing a fast, efficient means to process income and expenses, prepare detailed reports and maintain most of the information required at tax time. The system is a family of programs which operate by means of a "menu" selection scheme. When the operator selects a task to perform, the computer loads a program designed to handle that task from the system disc. The system disc contains all of the programs required to create, update and maintain data files and prepare the necessary accounting reports including a transaction journal, a P & L or income report, an interim or trial balance and a balance sheet.

Up to 255 separate accounts may be defined and a single disc system can hold over 1,400 transactions. This system automatically enhances the monitor screen to a 51 character by 24 line display. 32K of memory is required along with an 80-column printer and one or more disc drives.

This accounting software equals or exceeds higher priced packages for other computers and includes a detailed operating manual.

SHIPPING: All orders under $100 please add $2 regular, $5 air. All orders over $100 please add 2% regular, 5% air. California residents please add 6% sales tax. Orders outside the continental U.S., check with us for shipping amount; please remit U.S. funds. Software authors—contact us for exciting program marketing details. We accept MasterCard and VISA. Distributed in Canada by Kelly Software.

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C-10 Cassettes w/labels	.59 ea	10 for $5.50
Cassette storage box	.25 ea	10 for 2.00

5¼ DISCS

High quality, nationally advertised brand. *Guaranteed Performance!* We will replace any disc that fails during normal use. Discs are single sided, double density, reinforced hub with Tyvek sleeve. $2.25 each 10 for $19.95

ROMS

Basic 1.2	$39.95
Extended 1.1 w/manual	49.95
Disc 1.1	39.95

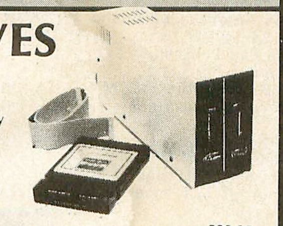
NEED MORE MEMORY?

64K Memory Expansion Kit

All parts and complete instructions (For 'E' and 'F' boards and CoCo II)

$39.95

COCO DISC DRIVES



COMPLETE SYSTEMS INCLUDE:

- Hi-Quality Teac Thin Line Drives
- Attractive, Beige Dual Drive Cabinet/Power Supply
- Fill Panel for Single Drive Disc Systems
- Radio Shack or J & M Controller
- Cable and Operating Manual
- Full 90 Day Warranty

Single Drive (SSDD) in Dual Cabinet w/Controller	299.95
Additional Drive	99.95
Two Drives (SSDD) in Dual Cabinet w/Controller	399.95
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Additional Drive	149.95
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Dual Cabinet/Power Supply	79.95
Disc Controller (Radio Shack or J & M)	139.95
Connecting Cable	24.95
Radio Shack DOS ROM 1.1	39.95

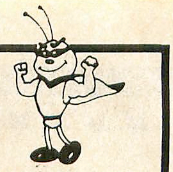
NEW! ZOOKEY

It's Fun!
It's Educational!
It's a great new way to learn typing skills! **Cassette $24.95** **Disc $27.95**

The combination of exciting game-play action and colorful, hi-res graphics in Zookey make it an outstanding typing tutor. Speed and skill levels are fully adjustable to train the beginner or challenge the most experienced typist.

Stimulating for both youngsters and adults...Ideal for classroom or individual instruction.

NEW! SUPER BUG



Mark Data Products **SUPER BUG** is a powerful, relocatable machine code monitor program for your CoCo. If you are a beginner, the program and documentation are an indispensable training aid, helping you to gain a better understanding of your Color Computer and machine code programming. If you are an accomplished computerist, **SUPER BUG'S** capabilities, versatility and convenience will prove invaluable during programming and debugging.

SUPER BUG offers so many outstanding features that we are unable to list them all in this limited space but here are a few: hex and alpha numeric memory display, modify, search, and test; full printer support with baud rate and line feed select; up to 220 breakpoints; mini object code disassembler; 64K mode setup; decimal, hex and asci code conversion routines and extensive documentation.

Tape $29.95 **Disc $32.95**

INFORMATIVE BOOKS

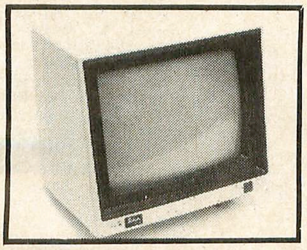
"Your Color Computer" by Doug Mosher

Over 300 pages of detailed information...an indispensable introduction to your Color Computer, complete with diagrams, photographs, and a BASIC thesaurus and command reference section. A CoCo encyclopedia. **$16.95**

"Programming the 6809" by Rodney Zaks

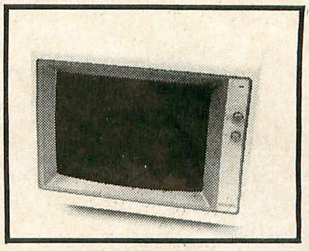
One of the best machine language texts available—required reference material. This book explains how to program the 6809 in machine language, covering all aspects progressively and systematically. **$15.95**

QUALITY VIDEO MONITORS



SAKATA COLOR SC-100- $269.95

The SC-100 is a streamlined 13" composite monitor which produces sharp, brilliant colors. The cabinet is made of durable styrene and is available in an attractive off-white color. Includes audio with speaker and earphone jack. We highly recommend this color monitor because of its excellent performance and beautiful styling.



TAXAN AMBER SCREEN- $129.95

A 12" amber screen composite monitor of the highest quality with exceptional reliability and performance. 18 MHZ bandwidth. Attractive off-white cabinet. We use this monitor in our offices.

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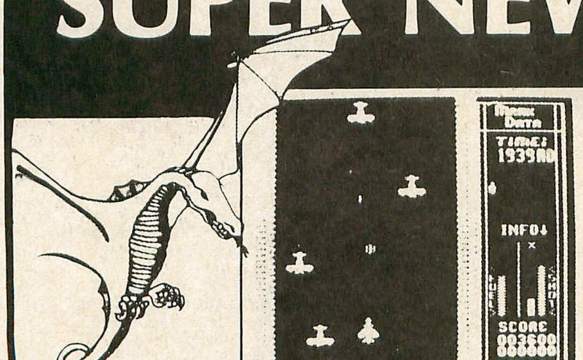
We carry the most asked for softlaw products for your convenience.

SUPER NEW GAMES!



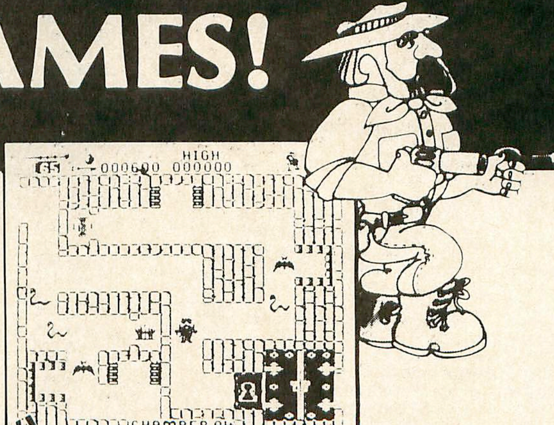
NEW!

TIME FIGHTER

Pilot your MD-64 fighter through a hazardous time tunnel. Your mission is to destroy the dreaded Time Guardian who threatens the natural order of the universe. In order to reach this menace you must fight aerial dangers from strange and different time zones. If you like fast action, this one's for you! 16K required.

Rainbow, March '84 *"One of the best in your library of computer games. It's a real gem."*

CASSETTE $24.95
DISC $27.95



NEW!

TUT'S TOMB

Explore the ancient, mystical tomb of the great Pharoah. Find the magical keys which lead you to unbelievable treasures as you out-maneuver the creatures that slither and swarm about you. Super fast arcade action—this one will knock your socks off with 16 screens of incredible color and sound. Fabulous! 32K required.

Hot CoCo, April '84 *"State of the art CoCo graphics. A first rate game."*

CASSETTE $24.95
DISC $27.95

Mark Data Products

RAINBOW

Give us your best: Join the ranks of these courageous CoCoists in showing the Color Computer world your high score at your favorite micro-diversion. We want to put your best effort on record in THE RAINBOW's Scoreboard column. All entries must be received 60 days prior to publication. Entries should be printed — legibly — and must include your *full* name, address, game title, company name and, of course, your high score. Each individual is limited to three score entries per month. Send your entries to Scoreboard, c/o THE RAINBOW.

★ Current Record Holder

ANDRONE *(Radio Shack)*

60,710	★Philippe Vallee, St. Raymond, Quebec
41,355	Ryan Devlin, Louisville, KY
40,030	Matthew W. Swadling, North Vancouver, British Columbia
37,410	Chris Dobson, Victoria, British Columbia
31,770	Tom Cassel, Tallahassee, FL
28,705	Terry Pribble, Davenport, IA
27,665	Brad Belcher, Decatur, IL
19,340	Cheryl Belcher, Decatur, IL

ATOM *(Radio Shack)*

X-39	★Lester Dorn, Eau Claire, WI

BAG-IT-MAN *(Aardvark)*

535,550	★Timothy Ruggles, Hialeah, FL
450,370	Jim Elford, Melbourne, Australia
418,790	Cornelius Caesar, Hofheim, West Germany
310,400	Eric Lecrouart, Ottawa, Ontario
237,750	Claude Cote, Herbertville, Quebec
175,470	Judy Fahy, Central City, PA
75,020	Jihan Croquerel, Laval Ouest, Quebec
70,050	Rejean Pati, Laval Ouest, Quebec

BASEBALL *(Radio Shack)*

1,409-0	★Brad Widdup, Dundas, Ontario
740-0	Daniel Belisle, Montreal, Quebec
464-0	Dave Fisher, St. Downey, CA
460-0	Walter Trainlips, Janesville, WI
327-0	Brian Blazer, Appleton, WI
143-0	Paul MacArthur, Gillett, WI
102-0	Andrew Lawrence, Cambridge, Ontario
83-0	Danny Rosenberg, Chicago, IL
70-0	Tony Boring, Armagh, PA

BATS AND BUGS (THE RAINBOW)

24,600	★Michael Rosenberg, Prestonburg, KY
8,450	Bill Martin, Myrtle Beach, SC
7,200	Lezlee Bishop, Salt Lake City, UT
3,600	Apollo Latham, Rich Square, NC
3,350	Eugene Watanabe, Salt Lake City, UT

BIRDS *(Tom Mix)*

50,000	★Michael Norris, Columbia, SC

BLACKBEARD'S ISLAND *(Tom Mix)*

86	★Mikel Rice, Panama City, FL

BLACK SANCTUM *(Mark Data)*

118	★Richard Dreher, Clay, NY

BLOC HEAD *(Computerware)*

23,500	★Paschal Wilson, Kentwood, LA

BUGS II *(Four Star)*

619,900	★Robert Teixeira, Mississauga, Ontario

BUSTOUT *(Radio Shack)*

14,756	★Amir Ijaz, Winnipeg, Manitoba

BUZZARD BAIT *(Tom Mix)*

2,983,350	★Blossom Mayor, East Greenwich, NY
2,902,700	Michael Popovich, Nashua, NH
2,087,650	Edmund Greene, Nashua, NH
659,100	Jeff Dempsey, Eatonville, WA
502,650	Chris Dempsey, Eatonville, WA
261,250	Jean-Francois Lauzier, Asbestos, Quebec
215,600	Nathaniel Williams, Bethesda, MD

CANDY CO. *(Intracolor)*

453,852	★Brian Blazer, Appleton, WI

CANYON CLIMBER *(Radio Shack)*

999,999,999	★Jocko Valentino, Timonium, MD
50,400,900	Adam Petersen, Portland, OR
14,890,900	Alan Halverson, Council Bluffs, IA
10,650,200	Jay Pribble, Davenport, IA
10,524,400	Billy Gavin, Bossier City, LA
4,015,000	Mike Marcol, River Grove, IL
3,749,200	Jerry Marsik, Murrayville, IL
132,800	Christine Janik
125,000	David Cox, Agincourt, Ontario
117,900	Raymond Verrier Jr., Hudson, MA

CAVERN COPTER (THE RAINBOW)

1280	★Sean Conner, Summit, NJ
1213	Doug Schwartz, Glendale, AZ
968	Michael Mefferd, Wren, OH
963	Joseph Calcaterra, Ridgewood, NY
790	John Rivers, North Adams, MA

CHOPPER STRIKE *(MichTron)*

262,900	★Dan Hopper, Omaha, NE
194,800	Andrew Norrie, Mississauga, Ontario
162,400	Andrew Figel, Sardis, OH
130,200	Benny Pischke, Lloydminster, Saskatchewan
111,300	Paul Mahoney, Inver Grove Hts., MN
92,400	Amir Ijaz, Winnipeg, Manitoba

CHUCKIE EGG *(A&F)*

163,150	★Paul Hotz, Herzlia B., Israel
147,410	Laura Hotz, Herzlia, Israel
78,480	Oren Bergman, Herzlia B., Israel
24,090	Michael Derman, Tel-Aviv, Israel

COLOR BASEBALL *(Radio Shack)*

250-0	★Rob Mowery, Robinson, PA
129-0	Scott Rens, Sioux Center, IA
121-0	Kevin Fjeldsted, Lundar, Manitoba
111-0	Ron Sujkowski, Bay City, MI
97-0	Michael Fjeldsted, Lundar, Manitoba
93-0	David Close, Springfield, VA
87-0	Mike Capeta, N. Canton, OH
74-0	Bruce Dorsey, Waldorf, MD
113-2	Ken Engstrom, Stoneboro, PA

COLORPEDE *(Intracolor)*

10,001,051	★Mark Smith, Santa Ana, CA
5,756,808	Scott Oberholtzer, Lexington, MA
3,355,248	Scott Drake, Pine City, NY
2,614,230	Jerry Petkash, Warren, MI
2,547,299	Rich McGervey, Morgantown, WV

COLOR ZAP *(Spectral Associates)*

155,690	★Mario Pelletier, Ste-Foy, Quebec

COPTER QUEST *(Zap Industries)*

384,130	★Donny Schiavone, Newport, RI

CRUISING *(Sunshine)*

3,936	★Paul Hotz, Herzlia, Israel
2,182	Joel Kirsch, Ra'anana, Israel
1,293	Omri Arad, Ra'anana, Israel
372	Saul Kirsch, Ra'anana, Israel

CU*BER *(Tom Mix)*

17,345	★Stephane Asselin, Baie-Comeau, Quebec

DANGER RANGER *(Med Systems)*

3,982	★Sarah Mandell, Ft. Worth, TX

DEFENSE *(Spectral Associates)*

55,205	★Michael Cerami, Springfield, VA

DEMOLITION DERBY *(Radio Shack)*

43,800	★David Close, Springfield, VA

DESERT PATROL *(Arcade Animation)*

516,250	★Gerry Shepperdson, Ste-Foy, Quebec

DOUBLE BACK *(Radio Shack)*

235,110	★Les Dorn, Eau Claire, WI

DOWNLAND *(Radio Shack)*

20,900,400	★Adam Petersen, Portland, OR
66,145	Jeanine McCuen, Rutland, MA
46,031	Shannon Blakey, Columbia, MO
45,744	John Marchese, N. Ridgeville, OH
45,659	Todd Witter, Chicago, IL
45,125	Peter MacLeod, Montague, Prince Edward Island
43,521	Tom Hutchinson, Craigmont, ID
41,832	Mike Marcol, River Grove, IL
36,228	Murat Croci, Washington, DC
23,445	Michael French, Covington, VA
21,717	Shawn Blakey, Columbia, MO
16,336	Andy Bryant, Lilburn, GA
11,318	Bobby Cha, Fullerton, CA

DRACONIAN *(Tom Mix)*

359,570	★Brad Widdup, Dundas, Ontario
353,990	Jamie Spreng, Dartmouth, Nova Scotia
300,710	Stephen O'Brien, Port Hawkesbury, Nova Scotia
251,190	Ronda Weigel, Dorval, Quebec
242,090	Lane Dewhirst, Courtenay, British Columbia
230,990	Cathy Neilon, Courtenay, British Columbia
179,310	Mike Holewinski, Addison, IL

ELECTION '84 (THE RAINBOW)

528 to 10	★Dusty Weathers, Prestonsburg, KY

ELEC-TRON *(Tom Mix)*

29,605	★Alan Morris, Chicopee, MA
28,280	Vernon Johnson, Parkville, MD
16,600	Paschal Wilson, Kentwood, LA
15,860	Brian Austin, New Salisbury, IN
14,625	Mike Sieradski, La Verne, CA

FIRE COPTER *(Adventure International)*

213,430	★Alan Morris, Chicopee, MA
112,550	George Dougherty, Hampton, VA
111,360	Kanti Dinda, Kingston, Ontario
107,370	Chris Hafey, Auburn, CA
97,390	Sam Hughes, Colton, CA

FLYBY *(Chromasette)*

195,580	★Jay Pribble, Davenport, IA

FOODWAR *(Arcade Animation)*

151,070	★Mathieu Paquin, Brossard, Quebec
147,645	Matt Griffiths, Stilwell, KS
104,075	Mike Scharf, Fremont, OH
94,905	Stephane Asselin, Baie-Comeau, Quebec

FOOTBALL *(Radio Shack)*

287-0	★Andrew Lawrence, Cambridge, Ontario
207-0	Chris Detje, Danbury, CT

FROGGIE *(Spectral Associates)*

108,490	★Bill Ide, Newark, DE

FURY *(MichTron)*

191,280	★Mario Pelletier, Ste-Foy, Quebec
113,700	Bernd Pruetting, Scheibenhardt, West Germany
107,760	Chris Detje, Danbury, CT
30,590	Chris Young, Ft. Worth, TX

GALACTIC FIGHTER *(Four Star)*

107,000	★Andrew Norrie, Mississauga, Ontario

GHOST GOBBLER *(Spectral Associates)*

19,820	★Teri Block, Sewell, NJ

GLAXXONS *(Mark Data)*

15,988	★Susan Ballinger, Uxbridge, Ontario
7,746	Stephane Asselin, Baie-Comeau, Quebec

GONE FISHING (THE RAINBOW)

25	★Brian Blazer, Appleton, WI

GRABBER *(Tom Mix)*

142,300	★Paul MacArthur, Gillett, WI
130,450	Daniel Belisle, Montreal, Quebec
109,100	Stephen Zamonski, Ewing, NJ

GRAN PRIX *(Computerware)*

2,810	★Jocko Valentino, Timonium, MD

HEIST (THE RAINBOW)

2,100	★Sergio Waisser, Mexico City, Mexico
1,500	Susan Ballinger, Uxbridge, Ontario
1,500	Julio Comello, Scarborough, Ontario
1,500	Kirstie Compton, Suffield, CT
1,500	Andy Dater, Medford, OR
1,500	David Figel, Sardis, OH
1,500	Diego Gallina, Summit, NJ
1,500	Tim Hoven, Eckville, Alberta
1,500	Joel Lombardi, Newark, DE
1,500	Jeff Roberg, Winfield, KS
1,500	Brendan Smith, Coral Springs, FL
1,500	Kevin Speight, Bridgewater, Nova Scotia
1,500	Rupert Young, Sheffield, MA

THE INTERPLANETARY FRUIT FLY (THE RAINBOW)

26,000	★Eric Foss, Cochrane, Alberta
25,000	Andrew Bartels, Sulphur, OK
15,000	Tony Boring, Armagh, PA
15,000	Joseph Calcaterra, Ridgewood, NY

THE JUNGLE (THE RAINBOW)

668,690,000	★Jeff Lawrence, Cambridge, Ontario
459,351,041	Denise Morin, Hudson, MA

JUNIOR'S REVENGE *(Computerware)*

36,200	★Stephane Asselin, Baie-Comeau, Quebec

JUNKFOOD (THE RAINBOW)

172,420	★Dorothy Baber, Detroit, MI
158,240	Eric Clarkson, Missouri City, TX
75,040	Jason Morrison, Spruce Grove, Alberta
64,750	Bryan Bell, South Lyon, MI

SCOREBOARD

39,300 Aaron Snyder, Hazleton, PA
10,610 Kris Ponder, Jacksonville, FL
KATERPILLAR ATTACK *(Tom Mix)*
63,361 ★Uwe Steingens, Essen, West Germany
KEY BOMBER (THE RAINBOW)
29,052 ★Tony Boring, Armagh, PA
THE KING *(Tom Mix)*
1,003,400 ★Tim Rueb, Atlanta, GA
133,400 A.J. Marks, Glen Ellyn, IL
88,600 Dennis Martin, Chalmette, LA
75,550 Ken Krejca, Chicago, IL
KLENDATHU *(Radio Shack)*
728,076 ★L. Grant Shideler, Lakewood, CO
LANCER *(Spectral Associates)*
162,300 ★Bryan Bell, South Lyon, MI
152,250 Ryan Morrison, South Lyon, MI
118,350 Clayton Foxworth, Florence, SC
102,800 David Carver, Galena, OH
99,950 Luanne Ashby, Phoenix, AZ
88,200 Jason Bell, South Lyon, MI
LEMANS *(Spectral Associates)*
0:69 ★Stephen O'Brien, Port Hawkesbury, Nova Scotia
LUNAR-ROVER PATROL *(Spectral Associates)*
185,950 ★Mark Jansen, Franklin, WI
179,350 Thomas Green, Natchez, MS
170,900 Jeremy Moon, Christchurch, New Zealand
79,950 Paul Hotz, Herzlia, Israel
45,600 Bryan Jenner, Calgary, Alberta
43,250 Rejean Pati, Laval Ouest, Quebec
41,600 Bryan Bell, South Lyon, MI
32,400 Betsy Peters, Chalk Hill, PA
MADNESS & THE MINOTAUR *(Radio Shack)*
220 ★Ellen Ballinger, Uxbridge, Ontario
MARATHON (THE RAINBOW)
102,500 ★Dusty Weathers, Prestonsburg, KY
MAZELAND *(Chromasette)*
10,160 ★Brian Austin, New Salisbury, IN
MEGA-BUG *(Radio Shack)*
13,805 ★Ron Sujkowski, Bay City, MI
8,065 Sheila Dorn, Eau Claire, WI
MICROBES *(Radio Shack)*
237,560 ★Todd Bartels, Coal Valley, IL
178,550 Apollo Latham, Rich Square, NC
144,350 Theodore Latham Jr., Rich Square, NC
98,450 Kent Jakway, Garrett, IN
59,960 Steven Allen, Sharpsburg, MD
MONSTER MAZE *(Radio Shack)*
200,000 ★Jason Pelfrey, Germantown, TN
115,130 Theodore Latham Jr., Rich Square, NC
10,370 John Hurley, Lawrenceville, NJ
MOON HOPPER *(Computerware)*
60,120 ★Julianne Garling, New Albany, MS
MOON SHUTTLE *(Datasoft)*
78,420 ★Kanti Dinda, Kingston, Ontario
MR. DIG *(Computerware)*
3,259,750 ★Ellen Ballinger, Uxbridge, Ontario
3,100,650 Biagio Di Lorenzo, Montreal, Quebec
2,520,650 Thomas Henry, Boca Raton, FL
2,441,700 Jeff Davis, Ridgecrest, CA
2,371,550 Ann MacKery, Port Hardy, British Columbia
300,200 Dan Durga, Flint, MI
MS. GOBBLER *(Spectral Associates)*
108,550 ★Bill Martin, Myrtle Beach, SC
MUDPIES *(MichTron)*
285,600 ★Stephen Zamonski, Ewing, NJ
NINJA WARRIOR *(Programmer's Guild)*
351,900 ★Jay Carr, Indianapolis, IN
187,600 Ed Hannon, Nutley, NJ
157,400 Sandra Maguire, Port Elgin, Ontario
151,100 Douglas Rodger, Harvard, MA
106,300 Bud Seibel, Tumbler Ridge, British Columbia
PAC-TAC *(Computerware)*
71,500 ★Bernard Lamer, St-Joite, Quebec
33,600 Chris Melbye, Thief River Falls, MN
21,630 Stephane Asselin, Baie-Comeau, Quebec
15,635 Curtis Frazier Jr., Enterprise, AL
10,570 Jon Clevenger, Lima, OH
8,220 Judy Fahy, Central City, PA
PENGUIN (THE RAINBOW)
11,660 ★David Bartmess, Fayetteville, PA
10,660 Mike Brattain, Ft. Wayne, IN
PINBALL *(Radio Shack)*
3,297,500 ★Chad Kidder, Battle Creek, MI
195,230 David Cox, Agincourt, Ontario
PIPELINE (THE RAINBOW)
1,162 ★Mike Garozzo, Morrisville, PA
483 Susan Ballinger, Uxbridge, Ontario
405 Joe Bironas, Crestwood, KY
302 Lisa Ballinger, Uxbridge, Ontario
PLANET INVASION *(Spectral Associates)*
32,350 ★Susan Ballinger, Uxbridge, Ontario
10,750 Saul Kirsch, Ra'anana, Israel
8,950 Michael Derman, Tel-Aviv, Israel
POLARIS *(Radio Shack)*
133,726 ★Ed Meyer, Vancouver, British Columbia
87,910 Ron Sujkowski, Bay City, MI
13,980 David Cox, Agincourt, Ontario
POLTERGEIST *(Radio Shack)*
4,825 ★Kevin Fjeldsted, Lundar, Manitoba
3,390 Denis Dion Jr., Thetford Mines, Quebec
3,025 Michael Fjeldsted, Lundar, Manitoba
2,795 Simon Clavet, Thetford Mines, Quebec
2,450 Keith Bishop, Warren, NJ
POOYAN *(Datasoft)*
1,546,000 ★Jeff Connell, Winona, MN
900,250 Daniel Belisle, Montreal, Quebec
194,800 Helene Gilbert, Rouyn-Noranda, Quebec
105,800 Kevin McGiverin, Howard City, MI
103,950 Kevin Kordana, Poughkeepsie, NY
103,600 Mike Garozzo, Morrisville, PA
60,200 Paschal Wilson, Kentwood, LA
52,250 Bobby Cha, Fullerton, CA
POPCORN *(Radio Shack)*
28,520 ★Teri Block, Sewell, NJ
26,140 Wes Thompson, Olney, IL
24,130 Phyllis O'Grady, Port Charlotte, FL
PROJECT NEBULA *(Radio Shack)*
2,010 ★Dan Heater, Cortland, OH
1,705 Ken Krejca, Chicago, IL
1,540 Tim Rueb, Atlanta, GA
220 Jason Pelfrey, Germantown, TN
PYRAMID *(Radio Shack)*
220/113 ★John Dupre, Mobile, AL
220/113 ★David Oelhaupl, Calgary, Alberta
220/115 Jeff Dempsey, Eatonville, WA
220/130 Cornelius Caesar, Gundelhardtstr, West Germany
220/130 J. Dillon, Fullerton, CA
220/130 George R. Fairfield, Victoria, British Columbia
220/133 Robert Dickau, Sacramento, CA
220/133 Allan Schaffer, Saratoga, CA
220/137 Jerome Galba, Rochester, MI
220/169 Jeff Lawrence, Cambridge, Ontario
220/180 Brad Belcher, Decatur, IL
QUIX *(Tom Mix)*
907,320 ★Andrew Norrie, Mississauga, Ontario
323,373 Jean-Francois Lauzier, Asbestos, Quebec
RAAKA-TU *(Radio Shack)*
50 ★Ellen Ballinger, Uxbridge, Ontario
50 ★Faith Barnett, Syracuse, NY
50 ★Jeff Brock, Ft. Lauderdale, FL
50 ★Mike Bubb, Grafton, OH
50 ★Brett Casteel, Russell, PA
50 ★Chris Cope, Central, SC
50 ★Aaron Flaugher, Hamilton, OH
50 ★Richard Gain, Tyler, TX
50 ★Jerome Galba, Rochester, MI
50 ★John Kidd, Clarksboro, NJ
50 ★Barney Laverty, Gauley Bridge, WV
50 ★Jason Morrison, Spruce Grove, Alberta
50 ★David Oelhaupl, Calgary, Alberta
50 ★Michael Thomas, Flint, MI
40 David Bryan, Kentwood, LA
40 Jeff Dempsey, Eatonville, WA
25 Ryan Devlin, Louisville, KY
25 Joel Flaugher, Hamilton, OH
25 Patric Flaugher, Hamilton, OH
20 Russ Auld, St. Petersburg, FL
RADIO BALL *(Radio Shack)*
3,708,810 ★Stephen Zamonski, Ewing, NJ
1,738,150 Mickey Emberton, Indianapolis, IN
1,465,000 Les Dorn, Eau Claire, WI
1,220,400 Kathy McGiverin, Howard City, MI
1,161,050 Jenny McInnes, Melbourne, Australia
1,103,090 Mike Sengstock, Meriden, CT
904,878 Tom Cassel, Tallahassee, FL
RAINBOW ROACH (THE RAINBOW)
1,766,900 ★Nicky Rockwell, Crouseville, ME
316,800 Don Wetherell, Charles City, IA
RETURN OF THE JET-I *(ThunderVision)*
538,432 ★Matt Griffiths, Stilwell, KS
ROAD RACE (THE RAINBOW)
91.7 ★Bill Martin, Myrtle Beach, SC
576.6 Eric Clarkson, Missouri City, TX
5416.4 Jon Hobson, Plainfield, WI
ROBOTRON *(Intracolor)*
483,800 ★Mark & Lee Jansen, Franklin, WI
ROBOTTACK *(Intracolor)*
7,528,100 ★Mike Scharf, Fremont, OH
3,364,100 Wade & Troy Woods, Paul MacLennen, Tiverton, Ontario
3,242,812 Edwin Prather & Cory Soper, Oxnard, CA
2,516,050 Horace Hamilton, Calgary, Alberta
2,216,950 Randy Hankins, Tabor, IA
SAILOR MAN *(Tom Mix)*
418,000 ★Sally Naumann, Hailey, ID
362,900 Fred Naumann, Hailey, ID
302,500 Scott Sherman, Woodstown, NJ
293,300 Kristopher Staller, Ft. Wayne, IN
191,000 Brandt Roberson, Collinsville, IL
171,600 Stephane Asselin, Baie-Comeau, Quebec
SANDS OF EGYPT *(Radio Shack)*
82 ★Jeff McKay, Travis AFB, CA
98 Aaron Durkee, Lansing, MI
SEA DRAGON *(Adventure International)*
4,770 ★Denis Dion Jr., Thetford Mines, Quebec
4,760 Simon Clavet, Thetford Mines, Quebec
SHENANIGANS *(Mark Data)*
106 ★Kanti Dinda, Kingston, Ontario
SHOOTING GALLERY *(Radio Shack)*
399,400 ★Adam Petersen, Portland, OR
SKIING *(Radio Shack)*
01.10 ★Mike Scharf, Fremont, OH
01:12 Sean Conner, Summit, NJ
05.85 John Hokpins, Greenville, SC
09.37 Tony Hall, North Bay, Ontario
11.83 Chris Zepka, North Adams, MA
12.02 Brian Austin, New Salisbury, IN
12.02 Chris Detje, Danbury, CT
SKRAMBLE *(Tom Mix)*
61,020 ★Paul Hotz, Herzlia, Israel
46,440 Steve Schutjer, Hazel Green, WI
39,800 Michael Derman, Tel-Aviv, Israel
28,810 Laura Hotz, Herzlia, Israel
28,250 Saul Kirsch, Ra'anana Israel
SLAY THE NEREIS *(Radio Shack)*
34,449 ★Wilfred Thibodeau Jr., Georgetown, ME
24,681 Bobby Cha, Fullerton, CA
SNAKER (THE RAINBOW)
1:24 ★Luanne Ashby, Phoenix, AZ
1:26 Dan Sobczak, Mesa, AZ
1:37 Susan Ballinger, Uxbridge, Ontario
1:59 Baiju Shah, Deep River, Ontario
2:21 Eric Burk, Williamsvill, NY
SPEED RACER *(MichTron)*
84,250 ★Chris Zepka, North Adams, MA
82,750 Daniel Frye, Mount Vernon, WI
SPIDERCIDE *(Radio Shack)*
2,820 ★Ken Felix, Crystal Lake, IL
790 Jason Hutton, Grand Rapids, MI
STARBLAZE *(Radio Shack)*
7,950 ★Matthew Daley, Binghamton, NY
7,950 ★Mike Marcol, River Grove, IL
STARFIRE *(Intellectronics)*
1,000,000 ★Jeff Roberg, Winfield, KS
STELLAR LIFE-LINE *(Radio Shack)*
62,390 ★Andrew Lawrence, Cambridge, Ontario
35,550 James Fox, Midlothian, VA
33,250 Jeff Lawrence, Cambridge, Ontario
24,280 Alan Kiste, Belding, MI
17,940 Curtis Denton, Edmonds, WA
STORM ARROWS *(Spectral Associates)*
320,100 ★Thomas Tiggelbeck, Essen, West Germany
231,100 Uwe Steingens, Essen, West Germany
TEEEOFF *(Prickly-Pear)*
34 ★Brad Widdup, Dundas, Ontario

TEMPLE OF ROM *(Radio Shack)*

134,900	★Matt Griffiths, Stilwell, KS

TIME BANDIT *(MichTron)*

999,110	★Matt Young, Cincinnati, OH
700,510	Dick Hertz, Mt. Healthy, OH
600,550	Mark Wooge, Omaha, NE
462,620	Stephen O'Brien, Port Hawkesbury, Nova Scotia
413,620	Doug Seibel, Tumbler Ridge, British Columbia
359,480	Kristopher Staller, Ft. Wayne, IN
179,400	David Grimm, Liverpool, NY
82,280	Gregory Grimm, Liverpool, NY
80,460	Eric Clarkson, Missouri City, TX

TIME FIGHTER *(Mark Data)*

510,100	★Jay Pribble, Davenport, IA

TOUCHSTONE *(Tom Mix)*

172,320	★Kristopher Staller, Ft. Wayne, IN
126,560	Ed Hannon, Nutley, NJ

TRAILIN' TAIL (THE RAINBOW)

119,705	★Diego Gallina, Summit, NJ
105,300	Jerry Dill, Frankfort, MI
102,930	Philip Parent, Smiths Falls, Ontario
94,810	Jean-Marc Parent, Smiths Falls, Ontario
76,275	Michael Rosenberg, Prestonsburg, KY
37,900	Tony Hall, North Bay, Ontario
28,710	Amir Ijaz, Winnipeg, Manitoba

TRAPFALL *(Tom Mix)*

70,392	★Paul Hotz, Herzlia B., Israel

TREKBOER *(Mark Data)*

161	★Warren Scollan, Seattle, WA

TUT'S TOMB *(Mark Data)*

184,380	★Biagio Di Lorenzo, Montreal, Quebec
163,060	Michael McCafferty, Oceanside, CA
158,000	Chris Russo, Miami, FL
134,580	Judy Smith, Gresham, OR
106,460	Eileen Kaakee, Royal Oak, MI

UGH *(Softek International)*

4,875	★Oren Bergman, Herzlia B., Israel

VENTURER *(Aardvark)*

2,260,200	★Jason Morrison, Spruce Grove, Alberta
470,000	Tony Hall, North Bay, Ontario
265,780	Mario Pelletier, Ste-Foy, Quebec

WACKY FOOD *(Arcade Animation)*

372,200	★Pascal Le Poore, Montreal, Quebec
326,900	Paul MacArthur, Gillett, WI
312,700	Brian Austin, New Salisbury, IN

WHIRLEYBIRD RUN *(Spectral Associates)*

16,900	★Stephane Asselin, Baie-Comeau, Quebec

WILDCATTING *(Radio Shack)*

322,582	★Dusty Weathers, Prestonsburg, KY
250,450	John Kidd, Clarksboro, NJ
36,838	Todd Rethemeier, Arvilla, ND
33,090	Jack Ballinger, Uxbridge, Ontario
31,973	Lisa Ballinger, Uxbridge, Ontario

WILLY'S WAREHOUSE *(Intracolor)*

183,500	★Alan Morris, Chicopee, MA
93,700	Craig Kluger, Miami, FL

ZAXXON *(Datasoft)*

2,057,800	★Chris Oberholtzer, Lexington, MA
1,700,000	Biagio Di Lorenzo, Montreal, Quebec
1,510,000	James Quadrella, Brooklyn, NY
666,000	Andy Green, Whitehall, PA
401,900	Mike Hughey, King George, VA
134,800	Sean Conner, Summit, NJ
133,000	Diego Gallina, Summit, NJ
102,000	Daniel Frye, Mount Vernon, WI
97,300	Chris Zepka, North Adams, MA
40,900	James Stipe, Granite City, IL

— Debbie Hartley

SCOREBOARD POINTERS

In conjunction with THE RAINBOW's Scoreboard, we offer this column of pointers for our game-playing readers' benefit. If you have some interesting hints and tips, we encourage you to share them by sending them to the Scoreboard, c/o THE RAINBOW.

BEATING COLOR BASEBALL

Scoreboard:

I have found some techniques that might help those readers playing *Color Baseball* by Radio Shack. When playing against the computer, and in the field, have the pitcher throw the ball to the catcher as the batter is on his way to the plate. When the batter is ready to bat, move the catcher directly in front of the pitcher and throw the ball to the pitcher. Then quickly throw the ball back to the catcher before the catcher reaches the plate. Even though the ball never reaches the plate, the computer calls it a strike. You can keep the computer scoreless.

Rob Mowery
Robinson, PA

ROLL HER OVER IN THE CLOVER

Scoreboard:

In the Adventure game *Shenanigans*, to get the shamrock from under the woman in the clover fields you just type `ROLL WOMAN` and use the shamrock to kill the snake at the mouth of the cave.

Does anyone know how to get the 12-foot pole into the cave after killing the snake? You need it to cross the rainbow. If so, write to me at Box 1771 Q.H., APO Miami, 34003. Also, if anyone needs help solving the Adventure *Calixto Island*, send me a SASE.

Lane Shelton
Panama City, Panama

PICKING UP MEN

Scoreboard:

To those of you with *Lunar-Rover Patrol* and an *EDTASM+* assembler, here is how to get more men. Just follow these instructions and don't press ENTER except where stated. Insert *EDTASM+*, turn on the computer, position tape to load LUN-ROV1 and type:

```
    Z ENTER
    B ENTER
    L ENTER ENTER
  XC4 ENTER
  G9F ENTER
  I10 ENTER
22369/(No. of men wanted) ENTER
    C ENTER
```

Brian White
Elkford, British Columbia

EXAMINING BLACK SANCTUM

Scoreboard:

I have solved Mark Data's *Black Sanctum* in 118 moves and would like to offer the following hints.

All commands are simple and common to most Adventure games. The shovel has no use, but the shears do. If you are having trouble getting anywhere, try examining something twice.

If you have made it to the crypt, try listening. Keep a running list of objects you are carrying to avoid wasting moves while taking inventory. Also, once you know what certain objects are, you will not have to "examine something" to get it.

Richard N. Dreher
Clay, NY

Scoreboard:

I have conquered the *Sands of Egypt*. It took me one week of staying up until 3:00 in the morning, but I finally did it. Some helpful hints to anyone that is still stuck: increase your vocabulary; you need your scepter to enter the pyramid; look at all items you pick up when you have them; and never drop your shovel. For more information write to me at 3737 West Augusta, 85021.

Rich Clark
Phoenix, AZ

JUMPING THE BARRELS

Scoreboard:

I have a tip for people who are having trouble passing the barrel screens on Tom Mix's *Donkey King* [now called *The King*]. Type `POKE 18888,23` and this will cause the barrels to stop once the first one hits the oil. Then you can run over the rest of them at high speed (you'll see).

I am just a beginner with Adventure games and I need some help with *Black Sanctum, Raaka-Tu* and *Sands of Egypt*.

I do have the solutions for *Bedlam* and *Williamsburg Adventure*. Write to me at 1604 Whittaker Road, 40014.

Jim Mathues
Crestwood, KY

Does This Sentence Make Sense?

By Steve Blyn
Rainbow Contributing Editor

There has been a recent trend back to stressing the "basics" in education. It was found that too many students who lacked basic skills were being promoted and even graduated from many schools. I feel this return to basics is essential to education in today's world.

The emphasis has been on reading, math and writing skills. We began to get away from these basics in the '60s and this trend continued into the '70s. A greater significance was placed on thought processes rather than on content. This kind of thinking was fine, but somehow the basics got lost in the shuffle. Average student achievement scores on standardized tests declined over the years.

This trend has been largely reversed in the '80s. The three R's are once again back in fashion. A few years ago, the New York City Board of Education instituted the "Gates Program." Every student is now given standardized tests in math and reading every few years. Minimum scores must be obtained on these tests in order to pass to the next grade. A student may pass all of his subjects, but must still pass the standardized exams to be promoted.

This type of program removes any capricious promotions of students who seem to have done well in their class work, but nevertheless have not achieved minimum competency in reading and math. The students who do not pass these tests are retained in their present grades and receive intensive small group instruction in the needed area the following year. Extra allowances, of course, are provided on these tests for learning disabled students.

There is also a third part of the Gates Program. This is a writing test. The test consists of three writing assignments. The student must show that s/he can properly communicate thoughts in writing. Since there is much more room for subjectivity in grading writing assignments, the tests are graded by teams of teachers. The student again must achieve a minimum passing grade.

I have participated on these grading teams and been astonished to discover some excellent, and some very poor, writing by junior high school students. There is surely a need to help a good number of our students to write using proper sentence structures. Therefore, it is the skill of writing properly that is the aim of our article this month.

Very common mistakes are in basic sentence structure. Some students have little idea when to stop their sentences with a period. This results in catastrophic run-on sentences. Other students end their sentences without finishing a complete thought. In this instance, either a subject or a predicate is left out.

This program contains four sentence parts in the `DATA` statements. The data is read on lines 80-110. The actual data is contained on lines 390-420. The sentence parts are subjects, verbs, prepositions and adverbs. Phrases or sentences are presented randomly. The user must decide if the words presented comprise a complete sentence.

We will consider the words presented to be a sentence if both a subject and a predicate are present. The sentences will be randomly scrambled by the program. Some of the thoughts may even be silly. The point, however, is to decide whether a sentence is presented.

The scrambling is done on lines 150-

(Steve Blyn teaches both exceptional and gifted children, holds two master's degrees and has won awards for the design of programs to aid the handicapped. He and his wife, Cheryl, own Computer Island.)

210. Line 150 picks random DATA statements from the four sentence parts A, B, C, and D. The variable 'E' will randomly choose to print one of the lines from 160-210. This will determine the phrase or sentence that is printed each time. The variable 'X' acts as a pointer to tell the computer whether a complete sentence has been selected. If X=1 then we have a sentence; if X= -1 then we have a phrase.

Four phrases or sentences are presented on each screen. After each appears, the child should type 'Y' or 'N' for a complete sentence. At the end of each set of four, the student may continue or end the program.

There is a final scoring at the end of the program. This will enable the student to check progress made in mastering this skill.

You may easily modify this program to suit individual needs. The data may be updated for your purposes. It is always best to include names that relate to the users. This requires no real programming changes.

If you change the amount of data within the DATA statements, be certain to also change the DIM statement on Line 30 and the READ statement on either lines 80, 90, 100 or 110. As always, Computer Island enjoys hearing from you about our ideas and programs. Write to 227 Hampton Green, Staten Island, NY 10312.

220 178
END 115

The listing:

```
10 REM"IS THIS A SENTENCE?"
20 REM" STEVE BLYN,COMPUTER ISLA
ND,NY,1985"
30 DIMA$(15),B$(5),C$(5),D$(5)
40 CLS
50 RESTORE
60 K=0
70 PRINT"       IS THIS A SENTENC
E ?":PRINTSTRING$(32,255);
80 FORT=1TO15:READA$(T):NEXTT
90 FORT=1TO5:READB$(T):NEXTT
100 FORT=1TO5:READC$(T):NEXTT
110 FORT=1TO5:READD$(T):NEXTT
120 FOR J=1TO4
130 PRINTSTRING$(32,239);::PRINT
" ";
140 REM"RANDOMLY CHOOSE THE KIND
 OF SENTENCE"
150 A=RND(15):B=RND(5):C=RND(5):
D=RND(5):E=RND(6):NN=NN+1
160 IF E=1 THEN PRINTA$(A)" "B$(
B)" "C$(C)".":X=1
170 IF E=2 THEN PRINTC$(C)" "A$(
A)" "B$(B)".":X=1
180 IF E=3 THEN PRINTA$(A)" "B$(
B)".":X=1
190 IF E=4 THEN PRINT B$(B)" "C$
(C)".":X=-1
200 IF E=5 THEN PRINT B$(B)" "D$
(D)" "C$(C)".":X=-1
210 IF E=6 THEN PRINT A$(B)" "C$
(C)".":X=-1
220 PRINT@157+K,"---";
230 PRINT@125+K,"?";
240 K=K+96
250 EN$=INKEY$
260 IF EN$="" THEN 250
270 PRINTEN$;
280 REM"  DECIDE WHETHER OR NOT
THE CORRECT CHOICE WAS MADE"
290 IF EN$="Y" AND X=1 THEN PRIN
T"     CORRECT":SOUND240,3:CC=CC
+1:GOTO 340
300 IF EN$="Y" AND X=-1 THEN PRI
NT"   SORRY,IT IS NOT A SENTENCE
":SOUND20,5:GOTO 340
310 IF EN$="N" AND X=-1 THEN PRI
NT"   CORRECT":SOUND240,3:CC=CC+
1:GOTO 340
320 IF EN$="N" AND X=1 THEN PRIN
T"   SORRY,IT IS A SENTENCE":SOU
ND20,3:GOTO 340
330 GOTO 250
340 NEXT J
350 PRINT@448,STRING$(32,224);
360 PRINT@480,"    'M' FOR MORE O
R 'E' TO END";
370 EN$=INKEY$
380 IF EN$="M" THEN 40 ELSE IF E
N$="E" THEN 430 ELSE 370
390 DATA HE,SHE,FRED,A BOY,A GIR
L,A DOG,A CAT,ADAM,MARY,SUE,SAL,
JIM,TOM,BOB,LOU
400 DATA RUNS,WALKS,SKIPS,HOPS,E
ATS
410 DATAAT THE STORE,AT NOON,AT
HOME,NEAR MY SCHOOL,IN YOUR CLAS
S
420 DATA QUIETLY,QUICKLY,SOMETIM
ES,OFTEN,NEVER
430 CLS:PRINT"         CHECK-UP T
IME":PRINT
440 PRINT"      YOU TRIED"NN"EXAM
PLES":PRINT
450 PRINT"       YOU DID"CC"CORRE
CTLY":PRINT
460 PRINT@448,"PRESS 'E' TO END
OR 'B' TO BEGIN";
470 EN$=INKEY$
480 IF EN$="B" THEN RUN ELSE IF
EN$="E" THEN END ELSE 470
```

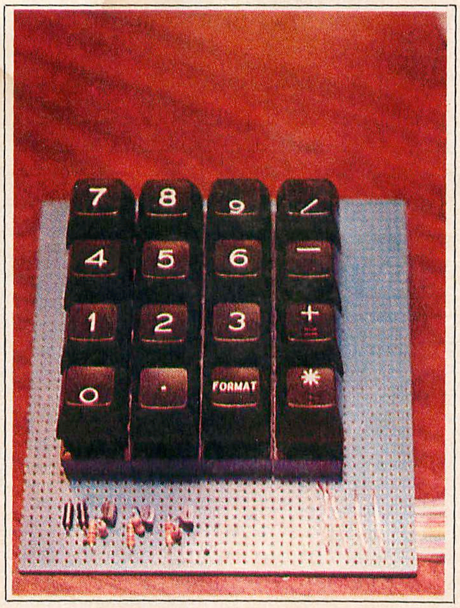
Adding A Numeric Keypad To Your CoCo

By Tony DiStefano
Rainbow Contributing Editor

Just the other day, I walked into my local electronics store and saw they had recently opened a warehouse bargain section in the rear of the tore. I immediately went in and started o browse. This place is a gold mine f old parts and nifty gadgets. Some tems I found were individual keyboard witches. They were surplus from who nows where, were of good quality and ery inexpensive.

If you recall, a while back I did an rticle on adding function keys to your eyboard. I explained that in the eight y seven matrix that makes up the oCo keyboard, there are four free eas and how to add switches. Ever nce then, I get requests to write an ticle on how to add a numeric keypad the Color Computer.

I looked into it and found that it uld be quite easy to wire one up. ry few components would be needed d it would not cost too much. About only thing that was keeping me from ing such an article was the actual keypad switches — there were none to be had around here. I could have used regular switches; after all, that is all that makes up the keyboard part of a CoCo, but it would not look like a nice keypad. Therefore, I put the numeric keypad article on the back burner.



Back at the electronics store, I picked up about 20 keyboard switches along with an assortment of keycaps. In no time at all, I had myself a nice numeric keypad. It was then that I decided I should submit "Adding a Numeric Keypad" to THE RAINBOW.

It is still up to you to find your own keyboard switches and keycaps. You will also have to build your own keypad case since the size and shape of your case will depend on what kind of keyboard switches you get and how many you decide to add (I'll explain later). In other words, all of the cosmetic side of this project will be left up to you. I will supply the schematic, parts list and method of putting together a numeric keypad.

For the benefit of those of you who do not know how the CoCo keyboard works, a little background information may help you with this project.

The keyboard has 53 keys. A PIA (Peripheral Interface Adapter) is used to scan these switches (keys). The eight keyboard columns are attached to the 'B' side of the PIA. These eight lines are programmed to be outputs.

The seven keyboard rows are attached to the 'A' side of the PIA. These seven PIA lines are programmed to be inputs. To read the keyboard, only one column is enabled by writing a zero in the bit that corresponds to that column and

---

ony DiStefano is well-known as an rly specialist in computer hardware ojects. He lives in Laval Ouest, uebec.)

by writing ones in all the other bits. If a key has been pressed in that column, one of the input lines will be a zero and the key location will correspond to the bit that is low. By scanning each column in the keyboard, all of the keys may be checked.

My idea is (if I run some wires in parallel to that of the keyboard lines) to take those wires and run them to a connector, and finally to some keyboard-like switches. Since the switches would be in parallel, this would give you the choice of pressing, for example, the number '1' on the main keyboard or on the numeric keypad. You could enter all your numeric data from the keypad.

But also, I included a few more keys that would be handy: the plus key(+), the minus key (-), the multiplication key (*) and the division key (/). Then there is the decimal point (.) and the ENTER key (CR).

The schematic in Figure 1 shows how to wire the above keys to the main keyboard connector. I chose those keys because it suited my needs. There is no reason why you could not change them to fit your needs, or for that matter, you can add a complete second keyboard. All you have to do is get the right wiring.

Figure 2 shows the complete wiring diagram of the CoCo keyboard. All versions of the CoCo or CoCo 2 keyboards are the same, even though the keyboards look different. That is one of the few things that did not change in the ever-changing CoCo.

Now, the next thing I didn't like was that if you wanted to enter a multiplication sign or a plus sign, you had to press the SHIFT key. I had two choices: 1) include the SHIFT key and press it every time you wanted these functions, or 2) make a small electronic circuit to automatically press the SHIFT key when you hit these keys. I elected to do the latter of the two.

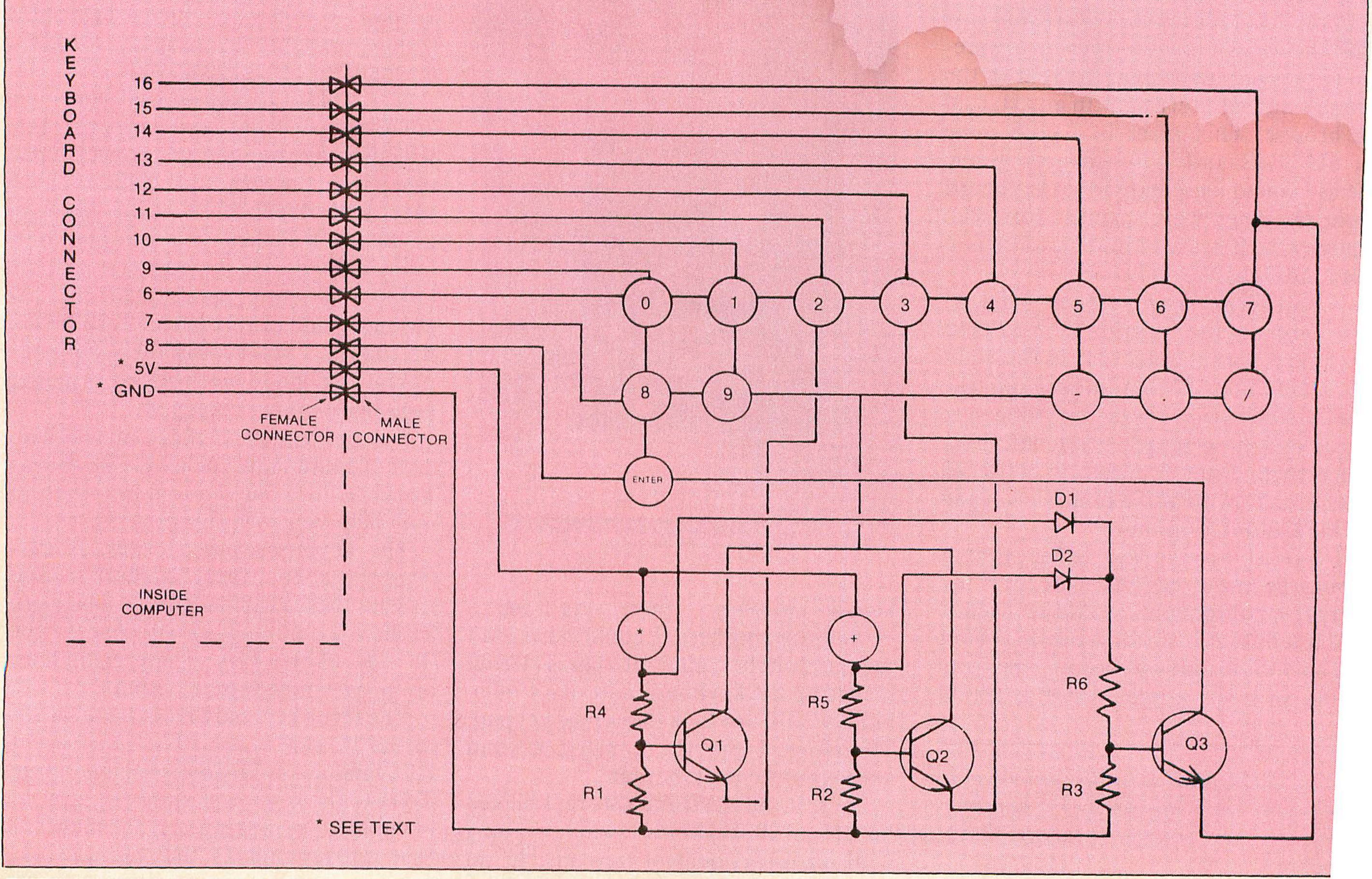
The switch that is normally used for the keyboard is an SPST (Single Pole Single Throw) momentary on. To automatically hit the SHIFT key and the key you want shifted would require a DPST (Double Pole Single Throw) momentary on. That way, both circuits would connect and we would get the shifted function, if any, of that key. That is a good way to do things, but I could not find a DPST switch in the shape of a keyboard key. So, I decided to make an equivalent transistorized circuit.

Look at the transistor part of the circuit diagram in Figure 1. Each transistor acts like a switch. The 10K bias resistor makes sure the transistor stays off when not being accessed. That is the equivalent of the switch being off or open (no key pressed).

The emitter of the transistor is connected to the output side (Port B) of the PIA. If you recall, all the 'B' lines are programmed to be outputs and are all high or five volts. Only one line at a time goes low, so when the line that has the emitter of the transistor connected to it goes low, the transistor's emitter is effectively connected to ground.

The 1K base resistor is used to limit the base current, but enough to turn the transistor on. The switch in this circuit is connected to five volts. When the switch is on (key pressed), current flows through the resistor, therefore, turning the transistor on. That makes the collector of the transistor ground potential. In turn, the ground potential

Figure 1 **Keypad Schematic**



on the collector grounds one of the corresponding input pins on the 'A' Port of the PIA. To the computer, this translates into a pressed key.

Now, take the plus key for example. The Port 'B' output that connects to this key is PB3 (keyboard connector #12). The input pin is PA5 (keyboard connector #7). I placed my transistor circuit on these two points as described above. Now, when I press the switch connected to the transistor, I get the semicolen (;), the unshifted plus.

I then made another transistor circuit for the SHIFT key and connected the base resistor to the same switch as the plus key. Now when I press the switch connected to the two transistors, I get the shifted plus in one key press. Nice, but this would require two transistors for every shifted key I needed. Use a simple diode to isolate the two transistors and now you only need one diode per shifted key. (I'm sure that someone will write me saying, "I found a way to do it with fewer parts," but this one works, so I'll use it.)

As a point of interest, this circuit can make an easy pause key. When you want to stop a listing, you press the SHIFT @ key. Well, this would make a one-key pause button.

You can really get carried away and make all of the shifted keys "one-key only." For example, "SHIFT backspace" means backspace the complete line. You can now have one key to "delete line." Another good one is the question mark (?). It is used as a short form for the PRINT statement.

The construction of this project requires a bit of doing and cutting. I'll leave that part up to you. As you can see in the photo, I used a proto-board and glued the keys onto it. You can see the transistors and resistors at the bottom. The important parts, like the theory of operation, schematic diagrams and keyboard layout, are here. There should be enough information here to get you going.

Since there are many board revisions to the CoCo, there might be a problem as to where to find the right connections to the keyboard. The best way to cover all versions is to connect directly to the keyboard connector itself. It is a 16-pin connector and all of them are wired the same way, even though the connector might be different.

I suggest you solder your wires to the connector. If the connector is too close to the board and you cannot reach its soldered pins, you could always remove the board and solder to the pins from the bottom side.

Remember, when soldering from the bottom, the pin numbers are backwards. The pin numbers go from 1 to 16; it is marked which side is 1 (left) and which side is 16 (right).

Find a good spot to mount the 15-pin connector — on the side of the computer directly under the keyboard is not bad. On the left or right depends if you are left- or right-handed.

Mount the female connector to the computer. Using a short length of ribbon wire, solder all the pins needed from the keyboard connector to the 15-pin connector.

There are two more connections that go to the 15-pin connector that do not go to the keyboard connector: the ground wire and the five volt wire. There is always a question of where is the best place to connect the five volts and ground. I always look for a 1. uf decoupling capacitor. They usually connect to the right points. If you are not sure, use pin #8 on the 74LS138 for ground and pin #16 on the same chip for the five volts. That is all the wiring you have to do on the computer side; the rest is all in the keypad adapter.

Solder another short length (the length is up to you) of ribbon wire to the male 15-pin connector. Make sure all the wires match the pinout of the female side. The rest of the wiring is done on the proto-board with the keyboard switches and other parts.

The parts list matches the needs of the schematic in Figure 1. If you are adding more keys, you will have to add more parts. The connector I used has 15 pins. There are a few free ones, but if you decide to do a complete remote keyboard (or somewhere in between) you will need to move up to the 25-pin connector since the 15-pin connector is not enough.

One last thing, if you write me and expect an answer, please include a SASE or, for faster responses, you can call me on Monday nights *only* (please). My number is (514) 474-4910.

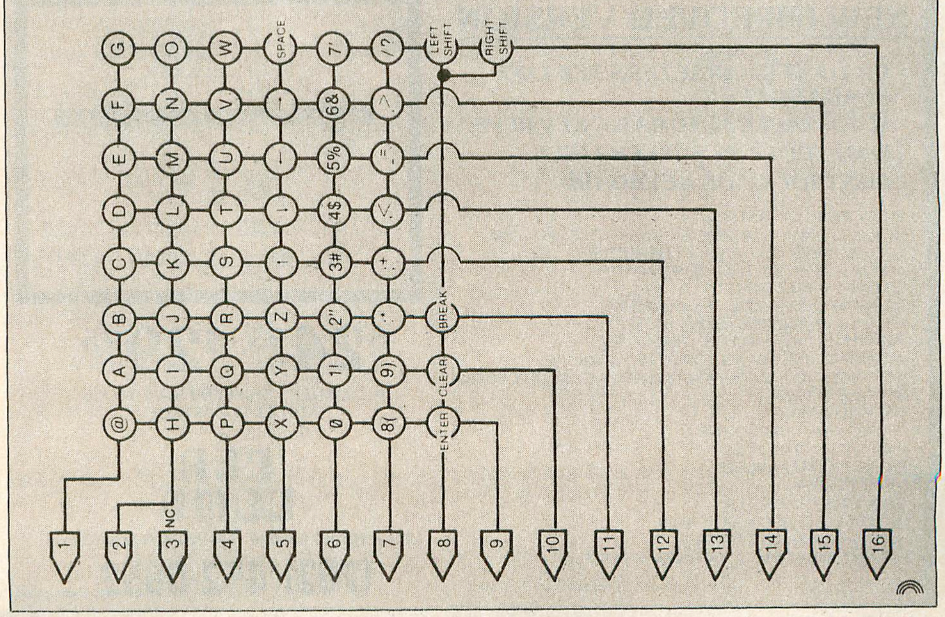
Parts List

ID	Description
Q1, 2, 3	2N3904 transistor
R1, 2, 3	10K 1/4W resistor
R4, 5, 6	1K 1/4W resistor
D1, 2	1N914 diode
C1	15 pin sub-D male
C2	15 pin sub-D female
Miscellaneous	16 (or more) conductor-ribbon wire 12 key-switches 12 key-caps proto-board
Hardware	plastic or metal case screws and mounting lugs, etc.

Reference

TRS-80 Color Computer Technical Reference Manual

Figure 2 **Keyboard Wiring Diagram**



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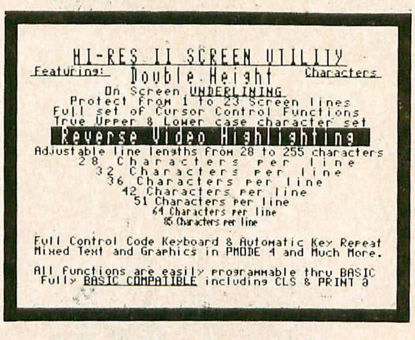

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Print @ on all line lengths	Yes	Yes	51 only
Different line lengths	28 to 255 (9)	28 to 255 (9)	51 only (1)
Automatic Key Repeat	Yes	Yes	Yes
Adjustable Key Repeat	Yes	No	No
Auto Repeat Disable	Yes	No	No
Erase to end of line/screen	Yes	Yes	Yes
Home Cursor	Yes	Yes	Yes
Solid or Blinking Cursor	Yes	No	Yes
CLS command supported	Buff/Biack	Buff/Black	Buff/Black
X,Y Coordinate Cursor Positioning	Yes	Yes	No
Double Size Characters	Yes	Yes	No
Individual/Continuous Highlighting	Yes	Yes	No
On Screen Underlining	Yes	Yes	No
Clear Key functional	Clear/L keys	Clear key	No
16.32 & 64K Supported	Yes	Yes	Yes
Green or Black Background Color	Yes	No	No
Dual Character sets for Enhanced 64 and 85 Characters per line display	Yes	No	No
Protected Screen Lines (programmable)	1 to 23	No	No
Full Control Code Keyboard for Screen control directly from the keyboard	Yes	No	No
Programmable Tab Character Spacing	Yes	No	No
Full Screen Reverse Function	Yes	Yes	No
Switch to & from the Standard 16 by 32 Screen for full compatability	Yes	No	No
On Error Goto Function	No	No	Yes
Extended Basic Required	No	Yes	Yes
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A Question Of Intelligence And Anthropomorphic Charm

By Michael Plog, Ph.D.
Rainbow Contributing Editor

Have you named your Color Computer? If you have not actually named your machine, have you assigned a sex to it — do you call your Color Computer a "he" or a "she"? Does your machine have a personality?

Throughout history, we have shown a tendency to assign human characteristics to things which are not human. This is called "anthropomorphism," and can easily be seen in the ways people have related to their pets and deities.

Anthropomorphism is not limited to things that are biological or mythical. We have always named objects that have no life, such as cars, boats, hurricanes, etc. In addition to naming such objects, we also assign personality traits to them. It is as if these inanimate objects have minds of their own. Indeed, that seems to be the key to anthropomorphism — a mind that operates independently of the human wishes.

(Michael Plog received his Ph.D. degree from the University of Illinois. He has taught social studies in high school, worked in a central office of a school district, and currently is employed at the Illinois State Board of Education.)

The things that we personalize tend to be either big, complex or mysterious. They are things that are not easily mastered or understood by people; we have a difficult time with them. Children tend to personalize nonliving objects more than adults, which is consistent with their limited understanding of the world around them.

But there are many adults who personalize things they know very well, possibly from a sense of affection for the inanimate object. You have probably seen grown men speak affectionately of an automobile, and call the car by a pet name. In many cases, these people know the inner workings of the car very well, and have perhaps taken the entire thing apart and put it together again. Anthropomorphism seems to be based not on ignorance, but more on either respect, affection (possibly love?) or fear.

It is easy to personalize computers, especially ones like your small friend, the Color Computer. True, it is not big — you can hold the entire thing in one hand under your arm while walking. The computer is, however, complex and mysterious. Sometimes it seems to have a mind of its own (especially when it wins a game).

Is your machine intelligent? Does it have a mind? Can we really assign motivations and mentality to silicon? The answers may not be simple. First of all, we do not know the meaning of intelligence. We have been prepared through movies such as *E.T.* and *Close Encounters of the Third Kind* to accept that things other than humans can have intelligence.

We have always considered other animals to have a sort of intelligence, but only recently realized that animals can use language. (Not an oral language, but the hand signs for the deaf or a keyboard connected to a computer.) Human intelligence may not be the same type of thing as ape or porpoise intelligence; we simply do not know.

In talking about computers, we often use terms which give the machine a type of intelligence. For example, "He got lost when there was no place to `RETURN` from" or "That subroutine is confusing her when you change the variable."

Computers are often personalized when there is blame to be shared. It is easy to say the computer fouled up a hotel reservation, or accidentally took $1,000 out of your bank account.

Children especially consider the computer to have intelligence, even

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something approaching a human mind and motivations. Computers can "cheat" or be "friendly." Computers are smart enough to beat you in a game, or tell you the right answer to a math question. For some children, computers are alive — because they know what to do next, and are smart enough to know right answers. As children grow older, their concept of "alive" becomes more mature and restricted to things biological. Yet, the question of life becomes more complicated, as does the question of intelligence.

Many people are fond of an old saying that computers will only do what their program tells them to. The first person to say this was the first "modern" programmer, Lady Ada Lovelace, in 1842 (working on the "analytical engine"). Her statement was: "The analytical engine has no pretensions whatever to originate anything. It can do whatever we know how to order it to perform." A century and a half later, we are still using Lady Lovelace's thought to maintain the superiority of humans over machines.

That thought may be true, but in one sense it elicits a question. A computer without a program may be only plastic, metal and silicon. With a program, however, is there intelligence operating? Consider the question with a human being — without life, there is no intelligence; we are simply a collection of very complicated proteins and other chemicals. After death, a person cannot be said to be intelligent. With life added (or before taken away), we are an intelligent entity. Perhaps computers work the same way; programs for computers create intelligence which are not more stupid for being less biological. The problem remains that we do not have a good definition of intelligence.

There is a whole file of study around these questions. It is called "AI," or Artificial Intelligence. People working in the field of AI gained a lot of attention about two decades ago, with the perfection of chess programs and using broad pattern recognition instead of linear instructions representing rules. There was then a decline of public interest in AI.

Recently, more attention has been given to AI research. Much of the material is philosophical in nature, asking hard questions and discussing the essence of such things as humanity, intelligence, mind, etc.

Information from AI inquiry is important on a less esoteric level. What we think about computers determines how we react with them. And beyond that, the question of a mind in the machine quickly turns into the human mind being considered as a machine.

People are thinking and speaking of themselves in computer terms. Sometimes we have to "clear our buffers" before entering a conversation filled with emotion. Some people always "fall back" to the "default" position in times of crisis, or when a "decision branch" needs to be made. Have you ever "debugged" a personal relationship? Do you know anyone who "flip-flops" on issues? Of course, you know a few people who should be "re-programmed," hopefully not "deleted."

The language of computers has become incorporated into our general speech and thought patterns. Thus, our language carries with it an assumption that what takes place in a machine is the same type of thing that takes place in a human mind.

Words determine the way we think about ourselves and the world around us. Computer jargon has not only introduced new words into our vocabulary, it has also introduced new ways of reacting to our environment.

For many of us who are older, the problem may not be too great. Our minds have already become accustomed to our interaction with our environment. For young school children, the way they relate to machines may well determine how they relate to other people, and even themselves.

It is difficult, maybe even impossible, to predict the different ways these relationships might be expressed. Possibly the best of all outcomes will be a society with computers and people working together to solve problems. Does it really matter if computers have intelligence, as long as we use that intelligence to help us to be more understanding, more tolerant and less ready to harm our neighbors?

Learning about the extension of mind and the relationship of mind and machine is not just a job for kids in school; all of us need to keep learning, to keep questioning. Education may well be the process of questioning, not necessarily the answers we get. Let's keep it up. Have you named your Color Computer? Does your machine have a personality?

If you have thoughts about anything mentioned here, please share them with me. My address is 829 Evergreen, Chatham, IL 62629.

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32K
Disk

The second of a two-part series

Landlord's Helper

By J.D. Ray

This is the second and final installment of a program system for managing rental property. This system was specifically designed for rental purposes, but can be altered to handle any type of small business venture such as private piano instructions, home business or a profit-making hobby. This installment will feature programs Four and Five. These programs will handle all the financial aspects of your enterprise.

These programs use direct access files, the most memory efficient method for using the disk as a filing system. Direct access files allow faster retrieval, easier alteration for updating your files and more efficient disk utilization. The Color Disk manual is a good tutorial for both kinds of disk files, however, the manual did leave out some important information.

In setting up the disk files, I discovered that serious problems can be run into when trying to manipulate more than one file at a time. If the files are not opened and closed properly, strange things happen to the files and computer. The computer can lock up, preventing any keyboard entry. When you reset, you have to reload your program. It is also easy

---

(J.D. Ray is minister of music at the Cooper River Baptist Church in North Charleston, S.C. He enjoys water skiing and woodworking as hobbies. He has two children, Jeff and Jenny.)

for the file information to be garbled and saved to the wrong file.

My solution to these problems is to take extra care when opening and closing the files, and entering and saving the information in systematic order. With respect to closing the access files, you must close the files in reverse order as they are written. For example, if you open file #1 and then open file #2, you must close file #2 first, then close file #1.

These programs use only one disk drive. However, if you use two drives with direct access files, you cannot have files open on both drives at the same time. (I again refer you to Bill Nolan's articles on direct access files found in the July-December 1984 issues of THE RAINBOW.)

Program Summary

TRANSACTions allows you to enter financial transactions. If you maintain a separate banking account for your rental property, you can simply enter the transactions from your checkbook and receipts. If you manage your business through your personal account, simply go through your checkbook and receipts and enter those transactions which pertain to the business. If the transaction was cash or credit card, enter "cash" or "cred" when prompted for the check/deposit number.

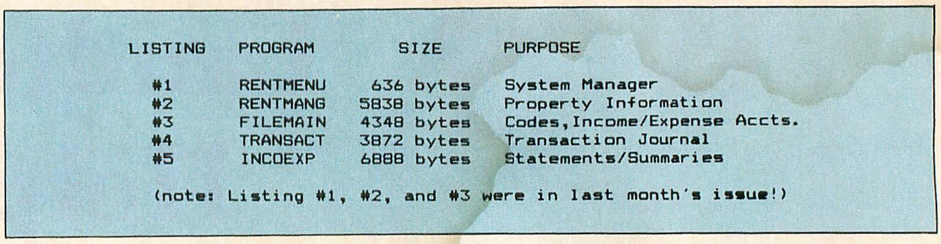
Please note that there is no change feature in this program should you enter incorrect data. If you make a mistake, try to catch it when prompted with "Is this information correct?" Should you miss the prompt, correct the error with the next transaction. You can label this transaction as "err."

This program generates a "Transaction Journal" for any given month or accounting period. When printing the journal to screen or printer, you can include all properties, or one specific property. Illustration 1 gives an example of the Transaction Journal for all property locations. The beginning balance entered should be the final balance of the preceding month. This feature allows you to keep running totals of individual properties.

INCOme/EXPense program compiles the information listed in your transaction journal into useful summaries. You can compile to your screen or printer:

* An Expense Summary listing all expenses
* An Expense Summary of individual expenses (see Illustration 2)
* An Income Summary listing all income
* An Income Summary of specific types of income
* A Monthly Summary of income and expenses (see Illustration 3)
* A Year-To-Date Summary

This program creates only one disk file called *SUMMARY.DAT.* To create this Year-To-Date Summary, you must compile a monthly summary and append this to the previous summary file. This is done automatically if you follow the prompts. Be careful and update the file only one time, or you will add the current monthly summary twice. First-time users should follow the correct prompt when establishing the summary file. The summary file will not be saved to disk unless you allow the program to do so!

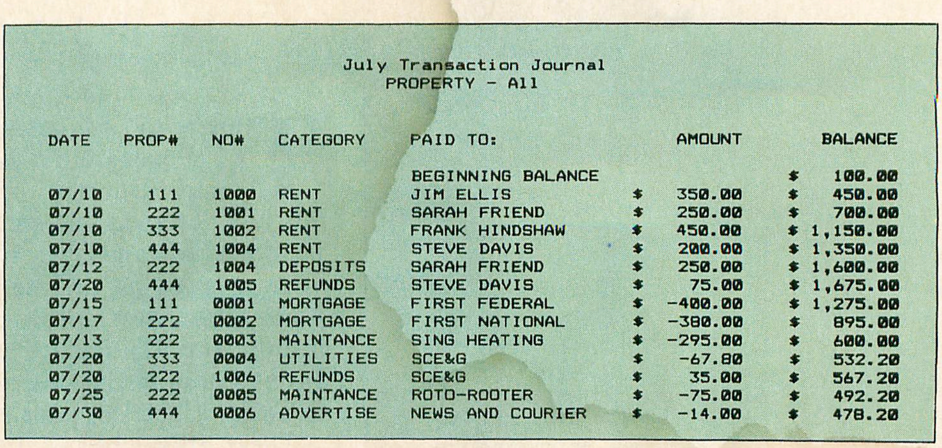


```
LISTING   PROGRAM         SIZE       PURPOSE

  #1      RENTMENU     636 bytes     System Manager
  #2      RENTMANG    5838 bytes     Property Information
  #3      FILEMAIN    4348 bytes     Codes,Income/Expense Accts.
  #4      TRANSACT    3872 bytes     Transaction Journal
  #5      INCOEXP     6888 bytes     Statements/Summaries

  (note: Listing #1, #2, and #3 were in last month's issue!)
```

Display 1

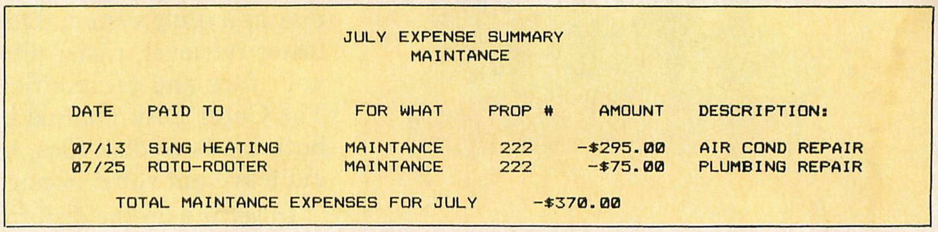


```
                        July Transaction Journal
                             PROPERTY - All


DATE    PROP#    NO#    CATEGORY     PAID TO:                 AMOUNT        BALANCE

                                     BEGINNING BALANCE                    $    100.00
07/10    111    1000    RENT         JIM ELLIS             $   350.00     $    450.00
07/10    222    1001    RENT         SARAH FRIEND          $   250.00     $    700.00
07/10    333    1002    RENT         FRANK HINDSHAW        $   450.00     $  1,150.00
07/10    444    1004    RENT         STEVE DAVIS           $   200.00     $  1,350.00
07/12    222    1004    DEPOSITS     SARAH FRIEND          $   250.00     $  1,600.00
07/20    444    1005    REFUNDS      STEVE DAVIS           $    75.00     $  1,675.00
07/15    111    0001    MORTGAGE     FIRST FEDERAL         $  -400.00     $  1,275.00
07/17    222    0002    MORTGAGE     FIRST NATIONAL        $  -380.00     $    895.00
07/13    222    0003    MAINTANCE    SING HEATING          $  -295.00     $    600.00
07/20    333    0004    UTILITIES    SCE&G                 $   -67.80     $    532.20
07/20    222    1006    REFUNDS      SCE&G                 $    35.00     $    567.20
07/25    222    0005    MAINTANCE    ROTO-ROOTER           $   -75.00     $    492.20
07/30    444    0006    ADVERTISE    NEWS AND COURIER      $   -14.00     $    478.20
```

Illustration 1



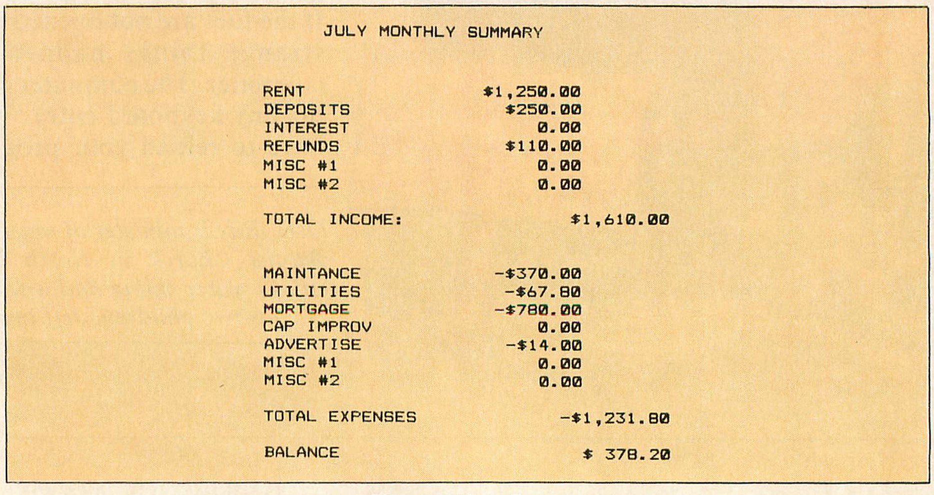
```
                         JULY EXPENSE SUMMARY
                               MAINTANCE

DATE    PAID TO             FOR WHAT      PROP #     AMOUNT     DESCRIPTION:

07/13   SING HEATING        MAINTANCE      222     -$295.00     AIR COND REPAIR
07/25   ROTO-ROOTER         MAINTANCE      222      -$75.00     PLUMBING REPAIR

      TOTAL MAINTANCE EXPENSES FOR JULY        -$370.00
```

Illustration 2



```
                  JULY MONTHLY SUMMARY


        RENT                    $1,250.00
        DEPOSITS                  $250.00
        INTEREST                     0.00
        REFUNDS                   $110.00
        MISC #1                      0.00
        MISC #2                      0.00

        TOTAL INCOME:                          $1,610.00


        MAINTANCE                -$370.00
        UTILITIES                 -$67.80
        MORTGAGE                 -$780.00
        CAP IMPROV                   0.00
        ADVERTISE                 -$14.00
        MISC #1                      0.00
        MISC #2                      0.00

        TOTAL EXPENSES                        -$1,231.80

        BALANCE                                $  378.20
```

Illustration 3

To Use the Entire System

1) Type in programs or buy RAINBOW ON TAPE.

2) Insert program disk and type "RUN RENTMENU".

3) First-time users select menu 4 — Set-Up Accounts (be sure to set up property codes, income and expense categories).

4) Select Main Menu Item 1 to set up property information or change property information. If you need to change property code, address or renter's name, be sure to also change the account file (Main Menu Item 4).

5) Select Main Menu Item 2 to enter monthly transactions. You *must* enter all monthly transactions at one time because a new file is set up every time you enter transactions. After you enter transactions, print a Transaction Journal for all properties or individual property locations. Transactions will automatically be saved to disk.

6) Select Main Menu Item 3 to compile information. Be sure to compile a monthly summary and append to the year-to-date file for accurate records.

7) Select Main Menu Item 5 to end program and return to BASIC.

Note: When entering month, enter the month number and be consistent. For example, February is 02 or 2, but not both!

I will be glad to assist anyone with specific applications for this program system. There are additional features that can be added to this program; some features I have added are: a BREAK key disable, key click, modified for high resolution screen, and a two-drive system. If interested, contact me at 5065 France Avenue, North Charleston, SC 29406.

200	225
440	66
700	179
960	115
1150	147
END	121

Listing 1:

```
10 '***TRANSACT***
20 '**MONTHLY TRANSACTIONS**
30 'LISTING #4
40 CLEAR1000:CC=164:FORX=1TO6
50 CLS:PRINT@CC,"MONTHLY INCOME
& EXPENSES"
60 CC=CC-32
70 FOR Z=1TO250:NEXTZ
80 NEXTX
90 X=0:DIM MTH$(12)
100 FOR ZZ=1 TO 12:READ MTH$(ZZ)
:NEXTZZ
110 DATA JANUARY,FEBRUARY, MARCH
 , APRIL , MAY , JUNE , JULY ,
 AUGUST,SEPTEMBER,OCTOBER,NOVEMB
ER,DECEMBER
120 K$="$##,###.##":KK$="$$####.
##":K1$="$###,###.##
130 X=0:OPEN"I",#1,"INCOME/ACC"
140 IF EOF(1)=-1 THEN CLOSE#1:GO
TO190
150 X=X+1
160 INPUT#1,INC$(X)
170 GOTO140
180 CLOSE#1
190 OPEN"I",#1,"EXPENSE/ACC"
200 X=0
210 IF EOF(1)=-1 THEN CLOSE#1:GO
TO270
220 X=X+1
230 INPUT#1,EX$(X)
240 GOTO210
250 CLOSE#1
260 'SUBROUTINE FOR INPUTTING MO
NTHLY INFORMATION
270 CLS:PRINT"  MONTHLY INCOME A
ND EXPENSES"
280 MN$="":BAL=0
290 PRINT@107,"SELECTIONS:"
300 PRINT@162,"1) INPUT TRANSACT
IONS"
310 PRINT@194,"2) VIEW DATA"
320 PRINT@226,"3) END JOB"
330 PRINT@394,"(1, 2, OR 3)"
340 AT$=INKEY$:IF AT$="" THEN 34
0
350 ON VAL(AT$) GOSUB 370, 920,
1430
360 GOTO 270
370 CLS:PRINT"          MONTHLY JO
URNAL"
380 PRINT:INPUT" MONTH (01-12):
";M1$
390 IF M1$<"01" OR M1$>"12" THEN
 380
400 PRINT:INPUT" PREVIOUS BALANC
E: ";PB
410 OPEN"D",#1,"JOURN"+M1$,64:GO
SUB910
420 TR = LOF(1)
430 TR = TR +1
440 CLS:PRINT@64,"eXPENSE OR iNC
OME (E/I)"
450 AN$=INKEY$:IF AN$=""THEN 450
460 IF AN$="E"THEN 470 ELSE 630
470 CLS:INPUT"EXPENSE DATE (MM/D
D)";D1$
480 INPUT"CHECK NO. (####): ";D2
$
490 INPUT"PAID TO ";IC$
500 PRINT:Y=1
510 IF EX$(Y)="" THEN 550
520 PRINTY;"  ";EX$(Y),
530 Y=Y+1
540 GOTO510
550 INPUT"FOR WHAT? (#) ";F
560 F$=EX$(F)
570 INPUT"PROPERTY NO. ";P$
580 LINEINPUT"DESCRIPTION: ";EC$
590 INPUT"AMOUNT ";AMT
600 TAM=AMT:TAM=-TAM:AMT=-AMT
```

```
610 PB=PB+TAM:PRINT"BALANCE: ";:
PRINTUSING K$;PB
620 GOTO770
630 CLS:INPUT"DEP. DATE (MM/DD):
 ";D1$
640 INPUT"DEP. NO. (XXXX): ";D2$
650 EC$="INCOME"
660 INPUT"INCOME FROM: ";IC$
670 PRINT:Y=1
680 IF INC$(Y)=""THEN720
690 PRINTY;"  ";IN$(Y),
700 Y=Y+1
710 GOTO680
720 INPUT"INCOME FOR: (#)? ";F
730 F$=INC$(F)
740 INPUT"PROPERTY NO.: ";P$
750 LINEINPUT"DESCRIPTION: ";EC$
760 INPUT"AMOUNT OF DEPOSIT: ";A
MT:TAM=AMT:PB=PB+TAM:PRINT" BALA
NCE: ";:PRINTUSINGK$;PB
770 PRINT:INPUT"IS THIS INFORMAT
ION CORRECT-Y/N-";AC$
780 IF AC$="N"THEN440 ELSE 790
790 LSET COD$=P$
800 LSET CAT$=F$
810 LSET DATE$=D1$
820 LSET CHNO$=D2$
830 LSET PDTO$=IC$
840 LSET DSC$=EC$
850 LSET AMT$=MKN$(AMT)
860 PUT #1,TR
870 INPUT"MORE INPUT (Y/N)";AN$
880 IF AN$="Y" THEN 430 ELSE 890
890 CLOSE#1
900 RETURN
910 FIELD#1,3 AS COD$,10 AS CAT$
,5 AS DATE$,4 AS CHNO$,17 AS PDT
O$,20 AS DSC$,5 AS AMT$:RETURN
920 'SUB-ROUTINE FOR VIEWING TRA
NSACTIONS
930 CLS:BAL=0:PRINT@5,"TRANSACTI
ON JOURNAL":PRINT
940 INPUT"WHAT MONTH (01-12): ";
M1$:INPUT"PREVIOUS BALANCE: ";BA
L
950 BX=BAL
960 PRINT:INPUT" SEND DATA TO PR
INTER (Y/N) ";PT$
970 IF PT$="N"THEN1030
980 'SUBROUTINE TO CHECK PRINTER
 STATUS
990 GOSUB 1010:IF I=1THEN 1030
1000 PRINT:PRINT"      PRINTER IS
 NOT READY!!":EXEC44539:GOTO1030

1010 IF PEEK(65314)/2=INT (PEEK
(65314)/2) THEN I=1 ELSE I=0
1020 RETURN
1030 'RESUME PROGRAM
1040 OPEN"D",#1,"JOURN"+M1$,64:G
OSUB 910
1050 CLS:PRINT@160,"DO YOU WANT
TO SEE ALL TRANS-    ACTIONS OR J
UST ONE PROPERTY     LOCATION?"
1060 PRINT@256,"ALL OR ONE (A/O)
"
1070 INPUT XX$
1080 IF XX$="O" THEN PRINT:PRINT
"WHAT IS THE PROPERTY NO. (XXX):
 ":INPUT MN$
1090 FOR TR=1 TO LOF(1)
1100 GET #1,TR
1110 AMT=CVN(AMT$)
1120 IF XX$="A" THEN 1140
1130 IF XX$="O" AND COD$ <> MN$
THEN 1270
1140 M1=VAL(M1$):BAL=BAL+AMT
1150 PRINT@2,"TRANS. SUMMARY FOR
 MONTH: ";MTH$(M1)
1160 IF PT$="Y"THEN GOSUB 1300
1170 PRINT:PRINTDATE$;" # "CHNO
$;"  ";:PRINT"ITEM: ";CAT$
1180 PRINT"          ";PDTO$:PRINT"
     ";DSC$
1190 PRINT"       NO:";COD$;" AM
OUNT:";:PRINTUSINGK$;AMT
1200 PRINT"        BALANCE: ";:PR
```

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```
INTUSINGK$;BAL:PRINT:PRINT:PRINT

1210 IF PT$="QQ"THENGOTO1410
1220 PRINT@458,"nEXT OR mENU? ";
1230 YY$=INKEY$:IF YY$=""THEN123
0
1240 IF YY$="N"THEN1270
1250 IF YY$="M"THEN 1280
1260 RETURN
1270 NEXT TR
1280 CLOSE#1
1290 RETURN
1300 'PRINT ROUTINE
1310 FORX=1TO3:PRINT#-2:NEXTX
1320 PRINT#-2,TAB(32);MTH$(M1);"
 TRANSACTION JOURNAL"
1330 IF MN$=""THENMN$="ALL"
1340 PRINT#-2,TAB(32);"   PROPER
TY - ";MN$
1350 PT$="QQ"
1360 FORX=1TO3:PRINT#-2:NEXTX
1370 PRINT#-2,"DATE  PROP#    NO
#   CATEGORY   PAID TO:
      AMOUNT        BALANCE"
1380 PRINT#-2
1390 PRINT#-2,"
                  BEGINNING BALANC
E                 ";:PRINT#-2,USIN
GK1$;BX
1400 RETURN
1410 PRINT#-2,DATE$;"    ";COD$;"
   ";CHNO$;"    ";CAT$;"    ";PDTO$
;"    ";:PRINT#-2,USINGK$;AMT;:PR
INT#-2,"   ";:PRINT#-2,USINGK1$;B
AL
1420 GOTO1270
1430 'SUBROUTINE TO RETURN TO MA
IN MENU
1440 RUN"RENTMENU"
```

40	45	324	97
84	24	372	91
130	184	416	176
182	138	450	247
228	217	END	183
280	199		

Listing 2:

```
2 '***INCOEXP***
4 '**INCOME/EXPENSE SUMMARY***
6 'LISTING #5
8 PCLEAR1
10 CLS:X=0:CC=165:FORCX=1TO6
12 CLS:BAL=0:PRINT@CC,"INCOME/EX
```

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```
PENSE SUMMARY"
14 FORX=1TO250:NEXTX
16 CC=CC-32:NEXTCX
18 CLEAR2000:DIM MTH$(12),BAL(25
),BZ(25),BL(25),AC$(20),IT$(25),
TT(25)
20 X=0:OPEN"I",#1,"INCOME/ACC"
22 IF EOF(1)=-1 THEN CLOSE#1:GOT
O28
24 X=X+1:INPUT#1,INC$(X):GOTO22
26 CLOSE#1
28 X=0:OPEN"I",#1,"EXPENSE/ACC"
30 IF EOF(1)=-1 THEN CLOSE#1:GOT
O36
32 X=X+1:INPUT#1,EX$(X):GOTO30
34 CLOSE#1
36 X=0:OPEN"I",#1,"PROPERTY/ACC"
38 IF EOF(1)=-1THENCLOSE#1:GOTO4
6
40 X=X+1
42 INPUT#1,COD$(X),ADR$(X),NAM$(
X):GOTO38
44 CLOSE#1
46 FOR ZZ=1 TO 12:READ MTH$(ZZ):
NEXTZZ
48 DATA JANUARY,FEBRUARY,MARCH,A
PRIL,MAY,JUNE,JULY,AUGUST,SEPTEM
BER,OCTOBER,NOVEMBER,DECEMBER
50 K$="$$##,###.##":KK$="$$####.
##"
52 CLS:PT$="Q":BAL=0:PRINT"
INCOME/EXPENSE SUMMARY"
54 PRINT@107,"SELECTIONS: "
56 PRINT@162,"1) EXPENSE SUMMARY
"

58 PRINT@194,"2) INCOME SUMMARY"
60 PRINT@226,"3) MONTHLY SUMMARY
"

62 PRINT@258,"4) YEAR-TO-DATE SU
MMARY"
64 PRINT@290,"5) END JOB"
66 PRINT@392,"(1,2,3,4 OR 5)
68 AT$=INKEY$:IF AT$=""THEN 68
70 IFAT$<"0" OR AT$>"5"THEN68
72 ON VAL(AT$) GOTO 76,178,282,4
32,494
74 'ROUTINE TO VIEW EXPENSES
76 CLS:BAL=0:INPUT"  WHAT MONTH
(01-12): ";M1$:PRINT
78 PRINT"ALL CATEGORIES OR ONE E
XPENSE     CATEGORY ? "
80 PRINT:Y=1
82 IF EX$(Y)="" THEN 90
84 PRINTY;"  ";EX$(Y),
86 Y=Y+1
88 GOTO82
90 PRINT:INPUT"CATEGORY (all/#)"
;F$
92 IF F$="ALL"THEN98ELSE94
```

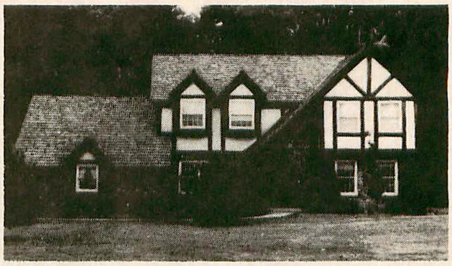
```
94 F=VAL(F$):CT$=EX$(F)
96 L1=LEN(CT$):GOTO100
98 CT$="ALL"
100 PRINT:INPUT" SEND DATA TO PR
INTER (Y/N) ";PT$
102 OPEN"D",#1,"JOURN"+M1$,64:GO
SUB176
104 M1=VAL(M1$)
106 CLS:PRINT@2,MTH$(M1);" EXPEN
SES - ALL PROPERTY"
108 PRINT"        CATEGORY - ";CT$
:PRINT
110 IF PT$="Y"THENGOSUB148
112 FOR TS=1 TO LOF(1)
114 GET #1, TS
116 CZ$=LEFT$(CAT$,L1)
118 IF CT$="ALL"THEN122
120 IF CT$=CZ$ THEN122ELSE132
122 AMT=CVN(AMT$)
124 IF AMT > 0 THEN 132
126 BAL=BAL+AMT
128 PRINTPDTO$;" ";COD$;" ";:PRI
NTUSINGKK$;AMT
130 IF PT$="QQ"THENGOSUB166
132 NEXT TS:CLOSE#1
134 PRINT:PRINT" TOTAL EXPENSES:
   ";:PRINTUSINGK$;BAL
136 IF PT$="QQ"THEN GOSUB170
138 PRINT:PRINT@455,"aNOTHER OR
mENU"
140 YY$=INKEY$:IFYY$=""THEN140
142 IF YY$="A"THEN76
144 IF YY$="M"THENCLS:GOTO52
146 CLOSE#1:RETURN
148 'PRINT ROUTINE
150 GOSUB486
152 FOR X=1TO3:PRINT#-2:NEXTX
154 PRINT#-2,TAB(30);MTH$(M1);"
EXPENSE SUMMARY"
156 PRINT#-2,TAB(35);CT$
158 PT$="QQ"
160 FOR X=1TO3:PRINT#-2:NEXTX
162 PRINT#-2,"DATE   PAID TO
      FOR WHAT    PROP #    AM
OUNT   DESCRIPTION:"
164 PRINT#-2:RETURN
166 PRINT#-2,DATE$;"  ";PDTO$;"
 ";CAT$;"   ";COD$;" ";:PRINT#-2
,USINGK$;AMT;:PRINT#-2,"   "DSC$

168 RETURN
170 PRINT#-2:PRINT#-2
172 PRINT#-2," TOTAL ";CT$;" EX
PENSES FOR ";MTH$(M1);"   ";:PRI
NT#-2,USINGK$;BAL
174 PT$="Q":RETURN
176 FIELD#1,3 AS COD$,10 AS CAT$
,5 AS DATE$,4 AS CHNO$,17 AS PDT
O$,20 AS DSC$,5 AS AMT$:RETURN
```

NEW!

'HOME COMMANDER' $59.95

BSR CONTROL MEETS THE CoCo



CONTROL YOUR WORLD

Give yourself piece of mind while on vacation by programming the HOME COMMANDER to control lamps, radios, TVs and more. Or make life easy on yourself by turning on the coffee pot before you wake up. You can do this and more with the HOME COMMANDER.

NO WIRES NECESSARY

The HOME COMMANDER uses your home's existing electrical wiring to control virtually anything. Appliances are controlled via small control modules (sold separately). The LAMP DIMMER MODULE allows you to turn a lamp on or off and control 16 brightness levels. The APPLIANCE MODULE is used to control appliances up to 400 watts such as a TV, radio, stereo system, fan or motor.

HOME COMMANDER

ON FRIDAY 7:42 PM, OFF SUNDAY 1:26 AM

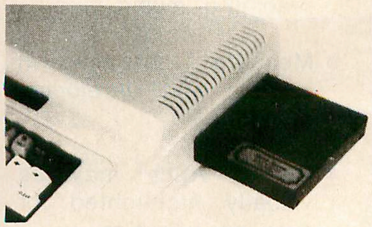
Included FREE is a program to allow you to control up to 256 devices and specify the time and date they are to be activated. That's right, the software has its own built in accurate clock.

LAMP DIMMER MODULE **$16.95** APPLIANCE MODULE **$16.95**

NEW! PRECISION TIME MODULE $59.95

THE TIMEPIECE FOR THE COLORAMA BBS

FREE TALKING CLOCK PROGRAM requires VOICE, SUPER VOICE, or SPEECH & SOUND PAK



Now your computer will always know the correct time and date. This amazing precision time module is calibrated to the National Bureau of Standards (WWV) atomic clock and you should never have to change it.

Use the PRECISION TIME MODULE to add the time element to your games or use on BBS. If you like, purchase separately our BBS.

COLORAMA (64 K, 1 drive minimum) **$89.95**

BATTERY BACKUP

Even when your computer is off, the clock keeps correct time by operating using the internal battery backup system.

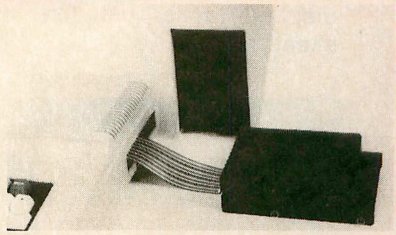
MONTHS, LEAP YEARS & DST

The PRECISON TIME MODULE automatically adjusts for the different number of days in each month as well as leap years. And believe it or not, it adjusts for DST so you don't have to remember if it's SPRING FORWARD or FALL FORWARD.

LOWEST PRICE ANYWHERE

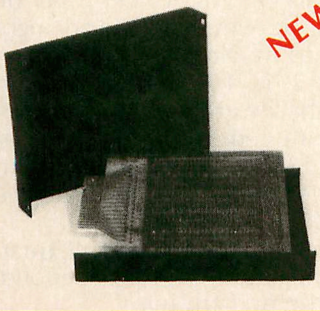
Y-CABLE $28.95

Why pay $100 to $200 for a multi-pak. With the Y-CABLE, you can connect your disk system to your computer along with either our STEREO PAK music synthesizer, our VOICE, SUPER VOICE speech synthesizers, or our PRECISION TIME MODULE. All connectors gold plated.



NEW!

ATTENTION EXPERIMENTERS!



Interested in building your own project? Our oversized board gives plenty of room for construction while the sturdy aluminum case with black satin finish assures protection and a professional appearance.

Prototype Board only **$19.95**

Prototype Enclosure only **$19.95**

Buy both for **$29.95**

Advanced Speech Chip SSI-263 (SC-02) **$34.95**

Need an SC-01? **$29.00**

Disks .... (any quantity)	$1.49
Tape C-10, C-20	$0.69
Hard Tape Box	$0.29
6821	$2.95
74LS138	$0.79
7407	$0.79
IC sockets 14, 16, 22 pin	$0.29
IC sockets 24, 28, 40	$0.39

FREE BLANK DISK OR TAPE WITH EVERY ORDER

VISA® MasterCard

Dealer Inquiries Invited

We accept CASH, CHECK, COD, VISA and MASTER CARD orders.

Shipping and handling US and Canada	$3.00
Shipping and handling outside the US and Canada	$5.00
COD charge	$2.00

Illinois residents add 6¼% sales tax

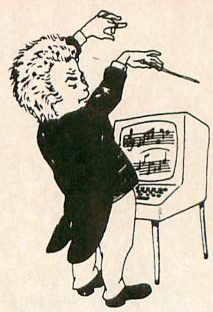
Speech Systems

38W 255 DEERPATH ROAD
BATAVIA, ILLINOIS 60510
(312) 879-6880 (VOICE)
1 MEGABYTE COLORAMA (312) 879-6811 (24 HR. BBS)

CALL ANY DAY, ANYTIME TO ORDER. ALSO ORDER BY MAIL OR BBS.

NEW!

MUSICA 2

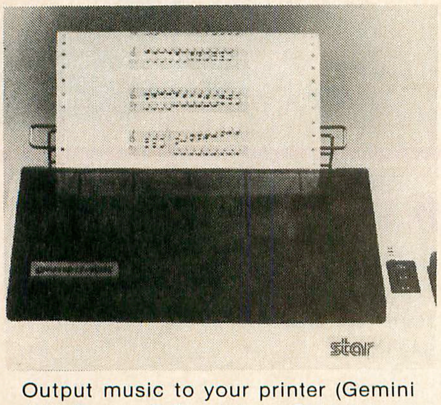


NEW LOW PRICE **$29.95**

Tape or Disk

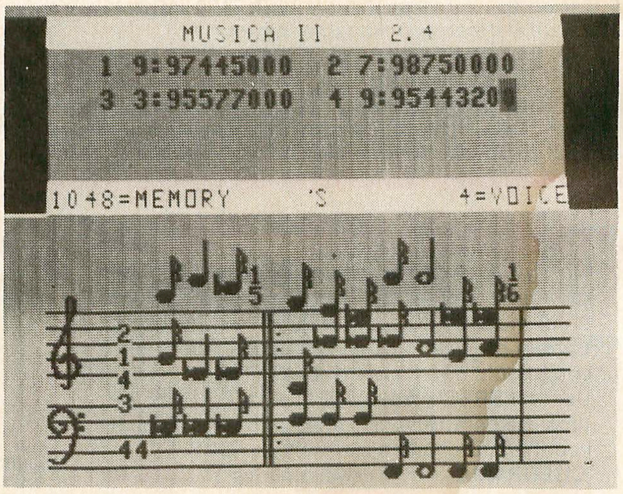
$5 OFF
With STEREO PAK
Purchase
Offer Ends APRIL 15

- Loudness of each voice may be individually specified.
- Memory available is constantly displayed.
- Voice waveshapes may be exchanged between voices at any point.
- Tempo may be specified and may even be altered as the music plays.
- Flats and sharps supported.
- Billions of timbre combinations.
- High resolution graphic display, looks just like sheet music.



Output music to your printer (Gemini 10X, Epson, R.S. printers, Okidata).

- When in stereo mode, music is played through our STEREO PAK (purchased separately).



```
MUSICA II        2.4
1 9:97445000  2 7:98750000
3 3:95577000  4 9:95443200

1048=MEMORY      'S        4=VOICE
```

- Repeat bars allow repeating of music without re-inserting music a second or third time.

"Musica 2 is GREAT!"
Stephen Wilson

"It's the best four part harmony composer on the market and the most used program in may files."
R.G. Wrights

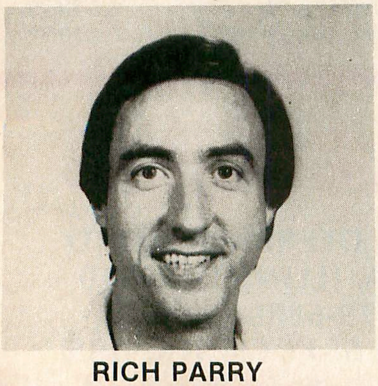
"Of all the music programs, and I've had them all, there is no comparison in flexibility, simplicity of operation and in the warm vibrant tones that it produces. I went out and spent $700.00 on stereo equipment just so I could more thoroughly enjoy Musica 2 and the Stereo Pak!"
Howard Lentz
TCI Industries

Download music from our BBS or Compuserve

- Voice timbre (waveshape) may be altered by specifying harmonic content just like stops on an organ.
- During editing, voice being inserted is displayed.
- Each measure is numbered for easy reading of music.
- Measure bars aid in reading and developing music.
- Each voice may be visually highlighted for easy identification.

THERE'S MORE

- 4 Voices produced simultaneously
- Input notes from keyboard or joystick
- Play music from your own BASIC program
- Block copy music for easy music development
- 100% machine language so it is lightning fast
- Vibrato effect easily produced
- With STEREO PAK, voices may be switched between left and right speakers as music plays
- MUSICA 2 is 100% software, no need for hardware unless you want music produced in STEREO. In that case, the STEREO PAK may be purchased separately. It's a must for the audiophile!
- Durations include: whole, half, quarter, eighth, sixteenth, thirty second, sixty-fourth, and triplet.
- 30 page manual describes all.



RICH PARRY

'I THOUGHT ONLY AN APPLE SOUNDED THAT GOOD'

That's what I was told after I gave a seminar and demonstration of MUSICA 2 and the STEREO PAK at the Chicago Rainbowfest. I smiled and thanked the young man for the "supposed" compliment, but upon reflection, I became angered by the apparent belief that the CoCo is inferior in this regard. Nothing could be further from the truth.

To help fight this false belief, we've decided to lower the price of MUSICA 2 to help spread the word.

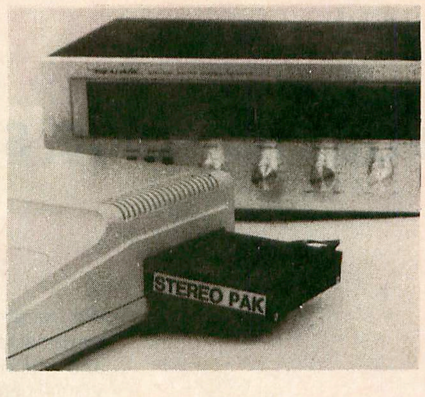
We will also keep the STEREO PAK price at $39.95 and give you a complete refund if you are not 100% satisfied with the STEREO PAK.

NEW! STEREO PAK™ $39.95

Plug this gem into your computer, connect to your home stereo system and sit back and enjoy music realism. The STEREO PAK is a hardware music synthesizer that plays our MUSIC LIBRARY and MUSICA 2 music in stereo. Because it was designed specifically with music reproduction in mind, the sound is superb. The highs are crisp and clear while the bass notes will rattle your walls.

The STEREO PAK is all hardware. It is intended as an enhancement for MUSICA 2 and our MUSIC LIBRARY. Disk owners may use the STEREO PAK with the R.S. Multi-Pak or our Y-CABLE ($28.95)

New!
NOW "PLAY"
AND "SOUND"
COMMANDS COME
THRU THE
STEREO PAK
Requires 64K



NEW! MUSIC LIBRARY™ 3 VOLUMES

10 HOURS OF MUSIC

BUY 2 GET 3rd FREE

You get over 100 four voice songs with a combined playing time of 3 hours. That's right, 3 hours of music. You won't belive your CoCo could sound so good. To fit over 100 songs required both sides of 5 C-20 tapes and the disk version uses 5 full disks (that's a half box of disks).

A JUKE BOX selection program is included to allow you to select specific songs or automatically play each. These songs are ready to go, you don't need MUSICA 2 or a knowledge of music.

These songs were developed using the best music program available for the CoCo; MUSICA 2. The tunes may be used as source files for MUSICA 2 and changed by the user. When coupled with the STEREO PAK the songs are reproduced in stereo with unsurpassed realism.

MUSIC LIBRARY 100 categories:

Stage, Screen, and TV
Music of the 70's
Music of the 60's
Music of the 50's
Old Time Favorites
Classical
Christmas (popular)
Christmas (traditional)
Patriotic
Polka Party

MUSIC LIBRARY 200
Our second volume of 100 tunes, 3½ hours of music.

MUSIC LIBRARY 300
Our third volume of 100 tunes, 3 more hours of music.

MUSIC LIBRARY (Each Volume) . . (32K Tape) . . . **$34.95**
(Specify 100, 200, or 300) (32K Disk) **$39.95**

NEW! SPEECH SYSTEMS DATAPEN

only . . . $29.95

FREE SOFTWARE

Two programs are provided free with each DATAPEN. SKETCH is a superb high resolution color drawing program allowing precise drawing and freehand sketching, painting and much more. SHAPE CREATE is a high resolution library shape drawing program. You can even save your work to tape or disk for later display or editing.

The software is shipped on tape and may easily be moved to disk. Included is complete documentation to allow you to integrate the DATAPEN into your own BASIC program.

EASY TO USE!

HIGHEST QUALITY

The DATAPEN is a lightpen, but unlike other light pens, it is far more sophisitcated.

- Insensitive to ambient light.
- Responds to different colors
- Program accessible LED lamp readout
- Switch for program control

WE STAND BEHIND OUR PRODUCTS

Like all our other products, if it is not the best, we won't sell it. If you're not 100% satisfied, merely return the DATAPEN for a complete refund.

FREE BLANK DISK OR TAPE WITH EVERY ORDER

VISA® MasterCard

Dealer Inquiries Invited

We accept CASH, CHECK, COD, VISA and MASTER CARD orders.

Shipping and handling US and Canada	$3.00
Shipping and handling outside the US and Canada	$5.00
COD charge	$2.00

Illinois residents add 6¼% sales tax

Speech Systems

38W 255 DEERPATH ROAD
BATAVIA, ILLINOIS 60510
(312) 879-6880 (VOICE)
1 MEGABYTE COLORAMA **(312) 879-6811 (24 HR. BBS)**
CALL ANY DAY, ANYTIME TO ORDER. ALSO ORDER BY MAIL OR BBS.

'TALKING SOFTWARE'

FOR THE VOICE, SUPER VOICE ™, RS SPEECH & SOUND PAK

RADIO SHACK® SPEECH & SOUND TRANSLATOR

FREE When you buy any 5 of our Talking Programs

We believe that no COCO speech synthesizer gives you the power and flexibility of the SUPER VOICE. Nevertheless, some have decided to go with the Radio Shack SPEECH & SOUND PAK. For those we've decided to open our TALKING LIBRARY by offering the SPEECH & SOUND TRANSLATOR . Just load this program and our entire library is open to you.

But that's not all, this program adds features. You get increased intelligibility, the power of an exception table to specify specific pronunciations, $12.81 is spoken in dollars and cents, 1,234,567 is spoken in millions, thousands, and hundreds, and much more. **$24.95**

TERMTALK All the features of an intelligent telecommunications program plus what appears on the TV is spoken.

- Upload and Download programs
- Full or Split Screen
- Normal or Reverse Video
- Control Xmit Protocols
- Buffer Editing
- It talks

Please specify version (VOICE or RS SPEECH & SOUND PAK)
Tape **$39.95** Disk **$49.95**

TALKING BINGO BINGO was never like this. The VOICE or SUPER VOICE makes all the calls while you sit back and play. Comes with 20 playing cards and 200 markers. High Resolution graphic screen, 3 timing level, ball count and pause control. **$24.95**

ESTHER the talking psychoanalyst. An excellent example of artificial intelligence. She may not solve all your problems, but her insight will amaze you. Just like the original Eliza. **$24.95**

SCORE E-Z A yahtzee type game. Up to six can play. **$24.95**

ADVENTURES

CULT OF THE CAVE BEAR You're a stranded time traveler 50,000 years in the past. Can you fix your time machine while still surviving in this alien environ, and make it back? **$29.95**

SHIP HUNT Play Battleship with your CoCo. All status reports are spoken. Ready battery, aim, fire at will! **$24.95**

FINAL COUNTDOWN You must stop the mad general from launching a missile at Moscow and causing WW III. Has multiple voices for added realism. **$24.95**

STAR TALK You're the Star Fleet Captain. Your mission...destroy the enemies' Dragon Star Ships. All status reports are spoken! **$24.95**

ADVENTURE GENERATOR Create talking adventure games that are 100% Machine Language. Up to 99 rooms, 255 objects, 70 command words and 255 conditional flags. 64K Disk **$39.95**

EDUCATION

CONTEST WINNER

ANIMATED SENTENCES The child builds complete sentences from a graphic menu using keyboard or joystick. The action is then spoken and acted out graphically. It's a great way to learn the parts of speech (ie. verb, subject, noun, etc.) **$24.95**

Congradulations Glenn Chamberlin

PRE-SCHOOL

TALKING COUNT TO ONE HUNDRED A program designed to teach the child counting to 100 by 1, 2, 5, and 10 forwards and backwards. **$29.95**

TALKING ALPHABET A program designed to help the pre-schooler master the alphabet. **$29.95**

TALKING NUMBERS & COLORS A must program for the very young. High Resolution graphics to insure attention and concentration. **$29.95**

TALKING NUMBER SKILLS The child becomes familiar with the shape and meaning of numbers. **$29.95**

TALKING CLOCK In these days of the digital clock, children miss an important education. This program aids the student in mastering the traditional analog clock. High Resolution graphics. **$29.95**

GRADES 2 - 6

TALKING SUBTRACTION A program specifically designed to help the student learn subtraction. **$29.95**

KING AUTHOR'S TALES A creative writing tool to allow a child to write compositions, or short stories. Q & A option is also included. **$29.95**

COLOR MATH Addition, Subtraction, Multiplication, and Division are mastered. Student may specify difficulty level. **$24.95**

SPELL-A-TRON Student builds a dictionary of words to be quizzed on. Perfect for Spelling B. **$24.95**

SPELLING TESTER A graphic spelling game. The student is shown objects to be spelled. **$9.95**

POETRY CREATOR The VOICE speech unit is used to speak poetry that is created. **$9.95**

SHORT STORY MAKER A program to create and speak stories created by the child. **$9.95**

FOREIGN LANGUAGE Learn a foreign language. French dictionary is included. **$9.95**

PRESIDENTS The student is able to master the Presidents of the US. **$9.95**

STATES A program designed to aid the student in learning correct spelling of the states. **$9.95**

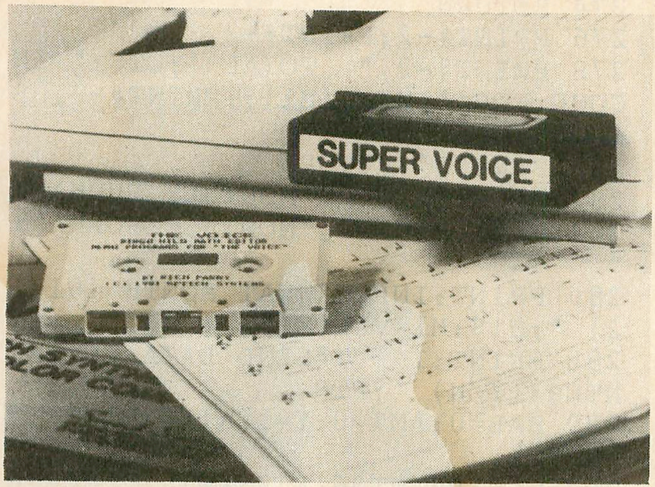
CAPITALS Learning the State's Capitals is made more interesting using speech. **$9.95**

HANGMAN A word guessing game. You must guess the word before you hang. **$9.95**

MATH DRILL A program to help teach arithmetic. **$9.95**

All software, except as noted, shipped on tape but may be moved to disk.

'SUPER VOICE' T.M.



COCO'S MOST ADVANCED SPEECH SYNTHESIZER.

NOW IT TALKS, SINGS AND MORE.

only . . . $79.95

The SUPER VOICE gives you COCO's most intelligible speech. The free TRANSLATOR text-to-speech program makes writing your own talking BASIC program as easy as SAY HELLO. Highest quality speech may be achieved by specifying inflection, intonation, articulation, and filtration. But that's not all, the SUPER VOICE can actually sing over a 6 octave range, play music and sound effects.

In 1979, VOTRAX brought us the SC-01 chip which made inexpensive speech synthesis possible. Speech Systems was proud to bring the COCO community the first speech synthesizer using this miracle device.
Now Silicon Systems Inc. brings us the SSI 263 (sometimes called the SC-02). Once again Speech Systems is happy to be the first to bring you this breakthrough in speech synthesis. The SSI 263 is the most advanced speech chip available. Read "Build a Third Generation Phonetic Speech Synthesizer" in the March 84 issue of BYTE magazine for details of this amazing chip.

FREE "REACTION" To Test Your Reflexes

FREE SUPER VOICE SINGS THE STAR SPANGLED BANNER

FREE "SIMON" To Test Your Memory

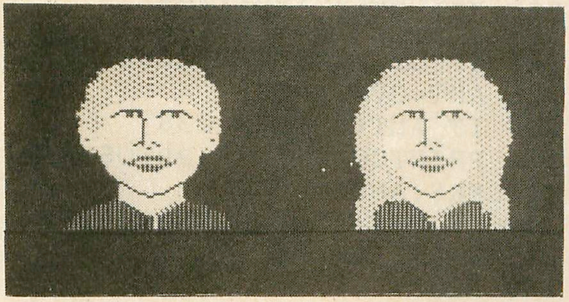
	SUPER VOICE	BRAND X	BRAND Y	BRAND Z
Synthesizer Device	SSI-263	SC-01	SP-256	SC-01
Speaking Speeds	16	1	1	1
Volume Levels	16	1	1	1
Articulation Rates	8	1	1	1
Vocal Tract Filter Settings	255	1	1	1
Basic unit of Speech	64 phonemes 4 durations each	64 phonemes	64 allophones 5 pause lengths	64 phonemes
Pitch Variations	4096 (32 absolute levels with 8 inflection speeds)	4	1	4

SUPER VOICE SONGBOOK VOL. 1

SUPER VOICE sings many of your favorite songs. Start your singing library today! ONLY ...$24.95

SUPER SYNTHER

SUPER SYNTHER allows you to use the SUPER VOICE as a music synthesizer. You can actually play the SUPER VOICE from your COCO keyboard as you would a piano. Vary the PITCH, FILTRATION, SOUND (Phoneme), and VOLUME to develop many unique sounds. $24.95



SUPER TALKING HEADS

Two heads are better than one.

When the SUPER VOICE speaks in a low pitched voice, the man speaks, when a high pitched voice is used the woman speaks. ~~$24.95~~
(see special offer)

FREE with your SUPER VOICE order until APRIL 15

Radio Shack® SPEECH & SOUND PAK version $24.95

FREE BLANK DISK OR TAPE WITH EVERY ORDER

VISA® MasterCard

Dealer Inquiries Invited

We accept CASH, CHECK, COD, VISA and MASTER CARD orders.

Shipping and handling US and Canada	$3.00
Shipping and handling outside the US and Canada	$5.00
COD charge	$2.00

Illinois residents add 6¼% sales tax

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(312) 879-6880 (VOICE)
1 MEGABYTE COLORAMA (312) 879-6811 (24 HR. BBS)
CALL ANY DAY, ANYTIME TO ORDER. ALSO ORDER BY MAIL OR BBS.

```
178 'SUBROUTINE TO VIEW INCOME
180 CLS:BAL=0:PRINT@10,"INCOME J
OURNAL":PRINT
182 INPUT"WHAT MONTH (01-12): ";
M1$
184 PRINT"ALL CATEGORIES OR ONE
INCOME     CATEGORY? "
186 PRINT:Y=1
188 IF INC$(Y)="" THEN196
190 PRINTY;"  ";INC$(Y),
192 Y=Y+1
194 GOTO188
196 PRINT:INPUT"CATEGORY (all/#)
 ";F$
198 IF F$="ALL" THEN204ELSE200
200 F=VAL(F$):CT$=INC$(F)
202 L1=LEN(CT$):GOTO206
204 CT$="ALL"
206 PRINT:INPUT"SEND DATA TO PRI
NTER (Y/N) ";PT$
208 OPEN"D",#1,"JOURN"+M1$,64:GO
SUB176
210 M1=VAL(M1$)
212 CLS:PRINT@6,MTH$(M1);" INCOM
E SUMMARY"
214 PRINT"           CATEGORY - ";C
T$:PRINT
216 IF PT$="Y" THEN GOSUB 254
218 FOR TS=1 TO LOF(1)
220 GET#1, TS
222 CZ$=LEFT$(CAT$,L1)
224 IF CT$="ALL"THEN228
226 IF CT$=CZ$ THEN228ELSE238
228 AMT=CVN(AMT$)
230 IF AMT<0 THEN 238
232 PRINTCOD$;"  ";PDTO$;:PRINTU
SINGKK$;AMT
234 IF PT$="QQ"THENGOSUB272
236 BAL=BAL+AMT
238 NEXT TS
240 CLOSE#1
242 PRINT:PRINT" TOTAL INCOME: "
;:PRINTUSINGK$;BAL
244 IF PT$="QQ" THEN GOSUB276
246 PRINT@455,"aNOTHER OR mENU"
248 YY$=INKEY$:IFYY$=""THEN248
250 IF YY$="A"THEN180ELSE52
252 RETURN
254 'PRINT ROUTINE
256 GOSUB486
258 FOR X=1TO3:PRINT#-2:NEXTX
260 PRINT#-2,TAB(32);MTH$(M1);"
INCOME SUMMARY"
262 PRINT#-2,TAB(38);CT$
264 PT$="QQ"
266 FORX=1TO3:PRINT#-2:NEXTX
268 PRINT#-2," DATE   PROP #   S
OURCE          FOR:
        AMOUNT"
270 PRINT#-2:RETURN
272 PRINT#-2,DATE$;"   ";COD$;"
   ";PDTO$;DSC$;:PRINT#-2,USIN
GK$;AMT
274 RETURN
276 PRINT#-2:PRINT#-2
278 PRINT#-2,"  TOTAL ";CT$;" IN
COME FOR ";MTH$(M1);:PRINT#-2,US
INGK$;BAL
280 PT$="Q":RETURN
282 'ROUTINE FOR MONTHLY SUMMARY
284 CLS:PRINT@9,"MONTHLY SUMMARY
"
286 PRINT:INPUT"WHAT MONTH (01-1
2) ";M1$:M1=VAL(M1$)
288 PRINT:INPUT"SEND DATA TO PRI
NTER (Y/N) ";PT$
290 BAL=0:AMT=0:Y=1:R1=0:T1=0:TT
=0:X=1
292 CLS:PRINT@6,MTH$(M1);" MONTH
LY SUMMARY":PRINT
294 IF PT$="Y" THEN GOSUB 404
296 T1=0:OPEN"D",#1,"JOURN"+M1$,
64:GOSUB176
298 BAL(X)=0:AMT=0
300 IF R1=0 THEN GOSUB 344 ELSE
346
302 L1=LEN(CT$)
304 FOR TS=1 TO LOF(1)
306 GET#1,TS
308 AMT=CVN(AMT$)
310 CZ$=LEFT$(CAT$,L1)
312 IF CT$=CZ$THEN314ELSE316
314 BAL(X)=BAL(X)+AMT
316 NEXTTS
318 PRINT"      ";CT$;
320 P1=11-L1:FORV=0TOP1:PRINT" "
;:NEXTV
322 PRINTUSINGK$;BAL(X):T1=T1+BA
L(X)
324 IF PT$="QQ" THEN GOSUB410
326 TI=TI+BAL(X):Y=Y+1:X=X+1
328 IF R1=1 THEN 332
330 IF IN$(Y)="" THEN336ELSE298
332 IF EX$(Y)="" THEN348ELSE298
334 IF R1=1 THENGOTO 348
336 PRINT:PRINT" TOTAL INCOME:
 ";:PRINTUSINGK$;T1:PRINT
338 IF PT$="QQ" THEN GOSUB416
340 R1=1:IN(1)=T1:Y=1
342 CLOSE#1:GOTO296
344 CT$=INC$(Y):RETURN
346 CT$=EX$(Y):GOTO302
348 PRINT:PRINT" TOTAL EXPENSES:
 ";:PRINTUSINGK$;T1:GOTO350
350 TT=IN(1)+T1:IF PT$="QQ" THEN
 GOSUB420
352 PRINT:PRINT" BALANCE:
 ";:PRINTUSINGK$;TT
```

```
354 IF PT$="QQ"THEN424
356 CLOSE#1:Y=1:X=1:R=0
358 EXEC44539
360 CLS:PRINT@96," DO YOU WANT T
O UPDATE THE        YEARLY SUMMAR
Y FILE?":PRINT:PRINT" UPDATE ONL
Y ONE TIME!"
362 PRINT:INPUT" (yES/nO/fIRST T
IME) ";UP$
364 IF UP$=""THEN364
366 IF UP$="Y"THEN370
368 IF UP$="F"THEN382 ELSE 52
370 CLS:Z=0:PRINT:PRINT"  LOADIN
G PREVIOUS SUMMARY FILE":FORP1=1
TO1500:NEXTP1:CLS:PRINT:PRINT"
ADDING CURRENT MONTH ":FORP1=1TO
1500:NEXTP1:CLS:PRINT:PRINT"  HI
T <ENTER> TO CONTINUE!!"
372 OPEN"I",#1,"SUMMARY"
374 IF EOF(1)=-1 THEN CLOSE#1:GO
TO382
376 Z=Z+1
378 INPUT#1,AC$(Z),BL(Z)
380 GOTO 374
382 OPEN"O",#1,"SUMMARY"
384 R=0:W=1:X=1:Y=1:Z=1
386 IF R=0 THEN BZ(W)=BAL(X)+BL(
Z):WRITE#1,INC$(Y),BZ(W)
388 IF R=1 THEN BZ(W)=BAL(X)+BL(
Z):WRITE#1,EX$(Y),BZ(W)
390 X=X+1:Y=Y+1:W=W+1:Z=Z+1
392 IF R=0 THEN GOTO398
394 IF R=1 THEN GOTO 400
396 Y=1:R=1:GOTO388
398 IF INC$(Y)="" THEN GOTO 396
ELSE 386
400 IF EX$(Y)="" THEN GOTO 402 E
LSE 388
402 CLOSE#1:EXEC44539:GOTO52
404 GOSUB486:GOSUB430
406 PRINT#-2,TAB(30);MTH$(M1);"
MONTHLY SUMMARY"
408 GOSUB430:PT$="QQ":RETURN
410 PRINT#-2,TAB(25);CT$;"
  ";
412 P1=11-L1:FORV=0 TO P1:PRINT#
-2," ";:NEXTV
414 PRINT#-2,USINGK$;BAL(X):RETU
RN
416 GOSUB430
418 PRINT#-2,TAB(25);"TOTAL INCO
ME:               ";:PRINT#-2,U
SINGK$;T1:GOSUB430:RETURN
420 GOSUB430
422 PRINT#-2,TAB(25);"TOTAL EXPE
NSES:             ";:PRINT#-2,U
SINGK$;T1:RETURN
424 GOSUB430
426 PRINT#-2,TAB(25);"BALANCE:
                  ";:PRINT#-2,U
SINGK$;TT
428 PT$="Q":CLOSE#1:GOTO360
430 FORX=1TO3:PRINT#-2:NEXTX:RET
URN
432 'YEAR-TO-DATE SUMMARY
434 CLS:PRINT"       YEAR-TO-DATE
 SUMMARY":PRINT
436 PRINT:PRINT"  YOU MUST SUMMA
RIZE CURRENT      MONTH AND ADD
TO YEARLY         SUMMARY FILE B
EFORE YEAR-       TO-DATE FILE W
ILL BE            ACCURATE.":PRI
NT
438 INPUT"  CONTINUE (Y/N) ";Q$
440 IF Q$=""THEN440
442 IF Q$="Y"THEN444ELSE52
444 PRINT:INPUT"  SEND DATA TO P
RINTER (Y/N)";PT$
446 PRINT:INPUT"  WHAT MONTH (01
-12): ";M1$:M1=VAL(M1$):PRINT
448 CLS:PRINT"      YEAR-TO-DATE
SUMMARY":PRINT
450 IF PT$="Y"THENGOSUB476
452 Z=0:OPEN"I",#1,"SUMMARY"
454 IF EOF(1)=-1 THEN CLOSE #1:G
OTO468
456 Z=Z+1
458 INPUT#1,IT$(Z),TT(Z)
460 PRINT IT$(Z),:PRINTUSINGK$;T
T(Z)
462 IF PT$="QX"THENGOSUB478
464 TZ=TZ+TT(Z)
466 GOTO 454
468 PRINT:PRINT"  BALANCE:  ";:P
RINTUSINGK$;TZ
470 IF PT$="QX" THEN 484
472 EXEC44539
474 TZ=0:GOTO52
476 GOSUB430:PRINT#-2,TAB(28);"
YEAR TO DATE SUMMARY - ";MTH$(M1
):GOSUB430:PT$="QX":RETURN
478 PRINT#-2,TAB(25);IT$(Z);"
    ";
480 L1=LEN(IT$(Z)):P1=11-L1:FORV
=0 TO P1:PRINT#-2," ";:NEXTV
482 PRINT#-2,USINGK$;TT(Z):RETUR
N
484 GOSUB430:PRINT#-2,TAB(25);"B
ALANCE:             ";:PRINT#-2,U
SINGK$;TZ:GOSUB430:GOTO472
486 'PRINTER STATUS
488 IF PEEK(65314)/2=INT (PEEK (
65314)/2) THEN I=1 ELSE I=0
490 IF I=1 THEN RETURN
492 PRINT:PRINT"   PRINTER IS NO
T READY!!":EXEC44539:RETURN
494 'END ROUTINE
496 RUN"RENTMENU
```

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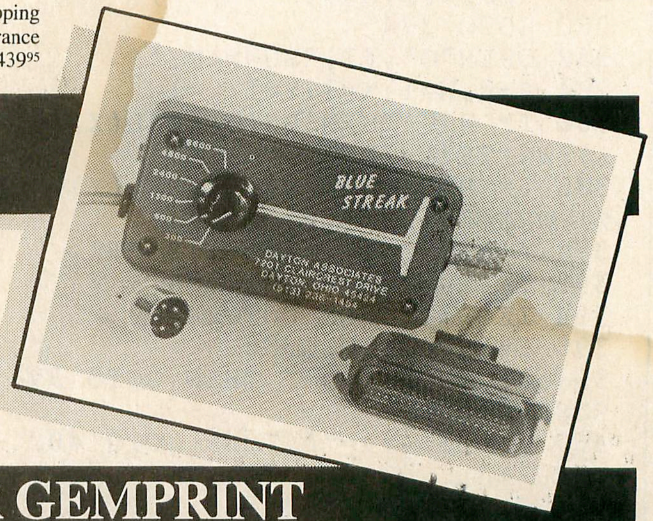
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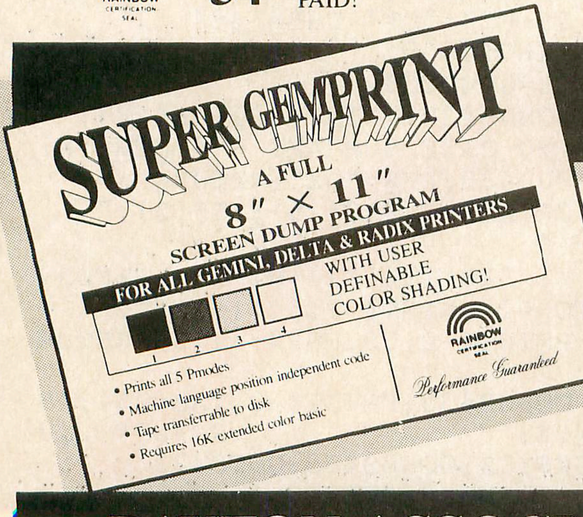
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A Fortress For Your Secrets/*First Coast Systems* 200
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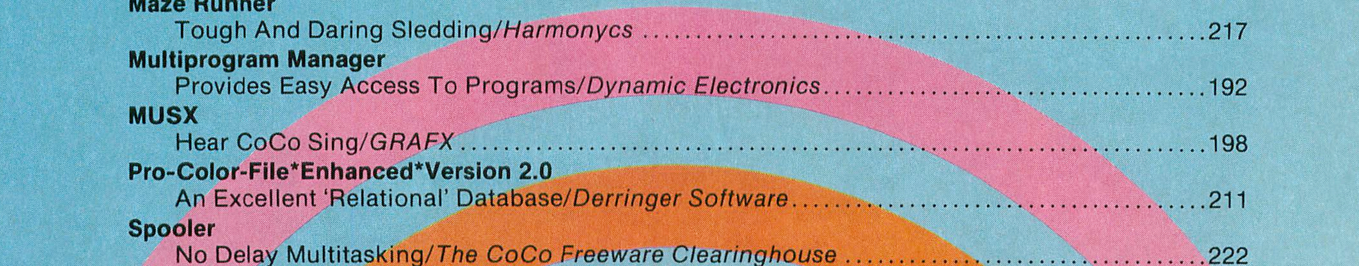

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If you've been plotting with your friends, trying to slip your dad a few hints about your Color Computer wish list, here's a suggestion:

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From Walt *Disney*, we have exciting learning games with Mickey Mouse and Donald, including Mickey's Alpine Adventure (26-2534, $34.95), a fun way to learn about vowels, consonants and the rules of

...ASK DAD FOR JUST ONE PROGRAM. HE'LL GET CARRIED AWAY!

spelling, and Telling Time with Donald (26-2530, $34.95).

Of course, there are always the best in arcade-style games to choose from, including Androne (26-3096, $19.95), pitting you against Data Bugs inside your computer, and Color Backgammon (26-3059, $17.95), the classic game of skill adapted for your Color Computer.

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Dad's sure to be tempted by our selection of convenient accessories, too, including the new TRS-80 Graphics Touch Pad (26-1185, $59.95). Use it with your software to make color graphics at a touch, or use it with games as a fast-action game paddle. We have printers, disk drives, joysticks, cassette recorders—even our Color Mouse—to tempt Dad, too.

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The following products recently have been received by THE RAINBOW, examined by our magazine staff and approved for the *Rainbow Seal of Certification*, your assurance that we have seen the product and have ascertained that it is what it purports to be.
This month the *Seal of Certification* has been issued to:

Personal Bookkeeping 2000, a 32K ECB disk home utility to organize personal finances. Possible are: handling of up to 45 accounts, cash or check entries, grand total command to give a printed record of all accounts to date and user definable expense categories. AMDT-Stardancers, 762 Brady Ave., Bronx, NY 10462, disk $39.95

Junior Typer, a 16K ECB learning aid that encourages touch typing, accuracy and speed with colorful graphics. Designed for elementary school students, it is menu-driven, enabling students to practice individual skills. Comes with teacher's guide. Aquarius People Materials, Inc., P.O. Box 128, Indian Rocks Beach, FL 33535, two disks $45

Super Utility 2.0, a 64K disk utility requiring at least one disk drive. It allows the user to use up to four single- or double-sided drives, 35 or 40 tracks per disk. (Some Radio Shack disks are not capable of 40 tracks.) B&J Software, Box 337, Vienna, NJ 07880, disk $24.95

Compugram Programming Service, a service offered to Color Computer owners wherein programs are written to suit the special purposes of the individual. Documentation will be provided if necessary, error trapping of data used and all programs written in BASIC. Compugram, P.O. Box 26663, Richmond, VA 23261, fees commensurate with service

MathFun Version 2.0, a 16K ECB educational program to sharpen skills in mathematics. Possible are the altering of the range of numbers generated to suit individual needs and skill levels. Compugram, P.O. Box 26663, Richmond, VA 23261, cassette $10

Memo Data Version 2.10, a 16K ECB utility to remind users of important events occurring in the future. Memo Data scans five days ahead for upcoming messages. Optionally, users can specify a date to which they want the program to scan. A listing of messages can be sent to the printer. Compugram, P.O. Box 26663, Richmond, VA 23261, cassette $15

CMODEM, an OS-9 communications utility to facilitate the transmission of data between 6809 computer systems and terminals or other computer systems. It supports dumb-terminal mode, upload and download in non-protocol mode and Christiansen protocol (CP/M MODEM 7) mode to enable communication with most other systems over telecommunication facilities. Computer Systems Consultants, Inc., 1454 Latta Lane, N.W., Conyers, GA 30207, OS-9 disk with source $100, without source $50

D&D Flashcard Review, a 16K non-Extended BASIC cassette or 32-64K disk study tool. From third grade spelling words to passive fluency of that second foreign language for a Ph.D., users are allowed freedom in choosing the subject matter in building this CoCo version of the tried and true learning aid of flashcards. D&D Software, Rt. 2, Box 47, West, MS 39192, $14.95

D&D Multiple Choice Test, a 32-64K teacher's utility that allows test files of up to 50 questions and answers. Files may be saved, loaded, printed, added to and changed. Score sheets may be printed for grading tests or tests may be graded on the computer. The test may be given on the computer if desired. Score files may be saved and loaded and reviewed on the screen or printed. D&D Software, Rt. 2, Box 47, West, MS 39192, $29.95

SIMON, a 64K programming utility requiring a disk drive to streamline any BASIC program's repetitions procedures. Although not for ML, *SIMON* will "watch" you use your BASIC program and remember up to 6,400 keystrokes and repeat them exactly as you performed them. Derringer Software, Inc., P.O. Box 5300, Florence, SC 29502, disk $24.95 plus $2 S/H

DMP100 Lineprinter Conversion Kit, a utility to allow the DMP100 printer to give upper- and lowercase characters with true descenders. Installation requires no soldering or cutting of the DMP100 circuit board. Electronic Closet, 8187 Blakely Ct. West, Bainbridge Island, WA 98110, $29

Backup Zero, a disk utility that will back up a complete disk in three passes instead of six using one drive requiring 64K. Free CoCo Software, Box 2231, Westover, WV 26502. Send postage paid return mailer with formatted disk, contributions accepted

Cassette Tape Tester, a 16K tape or disk utility for checking tapes for WRITE Errors as CoCo needs and deserves error free data. Free CoCo Software, Box 2231, Westover, WV 26502, send postage paid return mailer, formatted disk, or blank tape, contributions accepted

Salvage Disk, a 32K retrieval utility for crashed disks. It will not retrieve programs that are actually in the damaged portion of the disk but in case of the directory (usually the first to Kamikaze) *Salvage Disk* can come to the rescue. Free CoCo Software, Box 2231, Westover, WV 26502. Send postage paid return mailer and formated disk, contributions accepted

Master Scoreboard, a 16-32K ML program to provide a record of the top five scores for a block of 100 games (32K) or 32 games (16K). Features include expandable record saving capability user windows, auto key repeat with adjustable rate, on-screen instruction and Hi-Res screen display. Genesis Software, P.O. Box 936, Manchester, MO 63011, cassette or disk $11.95

CALINDEX, a 32K calendar/appointments program requiring one disk drive. Features include chain of command supervisor, multiple calendar management, list creation feature, automatic scan selection and perpetual calendar management. Grantham Software, 702 Washington St., Marina del Rey, CA 90292, disk $39, California residents add 6.5% sales tax

LFAST, Linear-Free Access-Source-Translation, a 32K assembly utility requiring one disk drive. Possible are the linking of ML programs, insertion of text messages in the object code stream and the ability to point to buffers where text arrays, numeric arrays and ML subroutines are located. D.J. Leffler, 955 Trinidad Rd., Cocoa Beach, FL 32913, disk $68.50

MTSCHESS, a version of the classical game of chess for the MC-10 Micro Color Computer. A 16K RAM extension module is required since *MTSCHESS* is more than 11K in length. Micro Ten Software Co., 496 Amboy Ave., Perth Amboy, NJ 08861, cassette $15.95

Que Bit, a 16K tape or disk version of *Q*Bert* requiring a joystick. The game objective is to succeed in changing the colors of the blocks of the pyramid through three levels of difficulty. Adversaries include Slick and Sam, hopping down undoing what you've done, dropping balls and a lethal but dimwitted snake that can be tricked into plunging to its doom. Mike Ro Products, P.O. Box 1317 Lavergne, TN 37086, cassette or disk $7.50

Double Driver, a video output adapter for the original Color Computer and TDP System 100. Provides both color video output (for color monitors and VCRs) and black and white output (for monochrome monitors). Moreton Bay Software, 316 Castillo St., Santa Barbara, CA 93101, $24.95 plus $2 S/H

Bob's Magic Graphic Machine, a 64K ECB graphics editor requiring a joystick which includes the doodle mode to allow a picture to be drawn on the screen and saved in binary format for later viewing and editing. Other features include the BASIC Picture Compile designed to allow the user to draw a picture and compile a BASIC program of the picture; the Subroutine Picture Compile designed for use in developing large, graphics-intensive programs. The Other Guy's Software, 875 South Main, Logan, UT 84321, cassette or disk $14.95 plus $2 S/H

Word-Pak II, an enhancement of *Word-Pak* now offering smooth scrolling (one pixel at a time), software video switch, a character set formed in an 8 x 10 matrix with full descenders and 8K Video RAM. PBJ, Inc., P.O. Box 813, N. Bergen, NJ 07047, cartridge $149.95 plus $2.50 S/H

Debacle, a 32K strategic Simulation re-enactment of the incredible British defeat of Major General Braddock's 1500 troops by a small band of French solders and a poorly organized group of Indian braves at Fort Duquesne in July 1755. Given Braddock's supplies and manpower it is up to you to avoid his fatal overconfidence and move your army through the rough mountain terrain, out-manuevering the Indian forays and safeguarding your troops' strength and supplies while preparing the path of attack. Picosoft Games, P.O. Box 35, Eighty-Four, PA 15330, cassette $24.95, Pennsylvania residents add 6% sales tax

Feuer and Gasse, a 32K strategic Simulation reenactment of the final battles of Belleau Wood and Chateau Thierry to stop the Imperial German Command's drive on Paris in 1918. The superiorly armed Germans routed the exhausted British and French with the first two offensives, but then our boys went "Over There" and although ill-equipped, field command was left to the initiative of the individual commanders. This unprecedented repudiation of European military strategy allows you to exploit America's staying power leading to the Armistice. Picosoft Games, P.O. Box 35, Eighty-Five, PA 15330, cassette $24.95, Pennsylvania residents add 6% sales tax

To Preserve Quandic, a 32K graphics Adventure on two disks requiring one disk drive. It is the 5th century A.D. A secret parallel civilization exists on Earth comprised of wise and humane scientists whose noble achievements include the development of Time Travel. In the shadow of Earth's emerging civilizations, Cerdric, a brilliant physician seeking elimination of diseases, succumbs to a germ-induced madness. He dismantles the time machine, scattering its parts throughout all time and escapes, when and whereabouts unknown with the most critical part. For the preservation of everybody, everywhere and for all time, you must find the pitiable Cerdric and return with him and the missing part to Quandic. Prickly-Pear Software, 2640 N. Conestoga Ave., Tucson, AZ 85749, two disks $39.95, plus $1.50 S/H. Arizona residents add 7% sales tax

CoCo LOGO For the TRS-80 Color Computer, published by Wiley Press and written by Dale Peterson, Don Inman and Ramon Zamora, this volume is based on the best of Uncle Bert Woofenburger's letters to his niece, Molly. Together they explore the learner-oriented turtle graphics and capabilities of the Color LOGO language. Radio Shack stores nationwide, $12.95

CoCo Grey, a hardware accessory that provides a real-time composite video 128 x 192 pixel signal with 16 shades of gray. It is designed to be used with the *VIEW II* software for slow-scan television. Soft Circuits, 401 S.W. 75th Terrace, North Lauderdale, FL 33068, $100

VIEW II, a BASIC and ML group of programs that allows the transmission and reception of 8.5 second slow-scan television through your cassette port. Pictures are stored with 128 x 192 resolution using 16 shades of gray. Utilities include: storing and retrieving pictures from disk, dumping pictures to printer and zooming images. Optional equipment supported includes the CoCo Grey and Micro Works DS-69 digitizer. Soft Circuits, 401 S.W. 75th Terrace, North Lauderdale, FL 33068, cassette or disk $34.95

ADDLINE, a 16-32K assembly utility for *EDTASM+* users which allows full screen text editors such as *Telewriter-64* or other ASCII cassette format editors to generate 6809 source code without the line numbers. Software Tools, P.O. Box 39532, Cleveland, OH 44139, cassette $7.35

CoCo Video Titler, a 16K utility to generate title screens for your videotapes. Spectrum Projects, Inc., P.O. Box 21272, Woodhaven, NY 11421, or P.O. Box 9866, San Jose, CA 95157-0866, cassette $19.95 plus $3 S/H

Color Checkbook, a 32-64K home financial utility to keep track of checking and savings accounts with the ability to print out individual personal checks. Spectrum Projects, Inc., P.O. Box 21272, Woodhaven, NY 11421 or P.O. Box 9866, San Jose, CA 95157-0866, cassette $29.95 plus $3 S/H

Klicker, a 64K ML program which causes a Color Computer 2 or TDP 100 to generate a keyclick through the TV loudspeaker whenever a key is depressed (except for SHIFT or SHIFT 0. Published by TEPCO, 30 Water Street, Portsmouth, RI 02871, $6

Animator Commercial, a 64K ECB graphics/animation program designed for professional use. Twelve full screen cels are stored in upper 32K and can be called from BASIC or fed to a VCR. Possible are variable speed scroll (any direction), sprites and text. Hi-Res and block versions supplied. Triad Pictures Corp., P.O. Box 1299, 134 Simders Rd., Sequim, WA 98382, two cassettes $50 plus $2 S/H

Animator Junior, a 16K ECB semigraphics version of *The Animator*. Sixteen cels, 500 frames provide over a minute and half of animation that can be called from your BASIC program. Triad Pictures Corp., P.O. Box 1299, 134 Simders Rd., Sequim, WA 98382, cassette $16, plus $2 S/H

Robot BASIC, a 16-32K ECB learning tool to teach beginners the rudiments of BASIC. Possible are the creation of graphics as well as a "Doodle Mode" for experimentation. Triad Pictures Corp., P.O. Box 1299, 134 Simders Rd., Sequim, WA 98382, cassette $18 plus $2 S/H

The *Seal of Certification* program is open to all manufacturers of products for the TRS-80 Color Computer, the TDP-100, or the Dragon-32, regardless of whether they advertise in THE RAINBOW. By awarding a *Seal*, the magazine certifies the program *does exist*, but this *does not* constitute any guarantee of satisfaction. As soon as possible, these hardware or software items will be forwarded to THE RAINBOW'S reviewers for evaluation.

— Monica Dorth

REVIEWING REVIEWS

CASTLE RAGOONA

Editor:

Thank you for reviewing the *Castle Ragoona* and *Enchanted Village* Adventure programs. There are a few points I would like to make clear about the programs.

First off, the reviewer states that the program is probably too complex for the beginning Adventurer but far too easy for the most experienced Adventurer. Surely, for the majority of us who lie somewhere between these two categories, the program is ideal!

The reviewer also states that there are no clues, hints or help from the program. This is simply not true. In fact, the instructions specifically state that clues are obtained by examining the objects or beings that you encounter. Perhaps the reviewer should have paid closer attention to the program himself, rather than just giving it to his children.

A major problem the reviewer sites is the fact that the Adventure maze is not in a random order. I did not visualize this as a problem; that is simply the way the program operates. Some Adventures vary each time they are played; others do not. *Castle Ragoona* has random features, but the maze is not one of them. In fact, most Adventures have some sort of maze that, once solved, takes only a few minutes to get through. I fail to see why the reviewer attacked such an insignificant point.

As to there being only one copy of the program on tape, the reviewer must have received an early version, as all current tapes have at least two copies of both programs on each cassette. Even so, it is Family Computers' policy to replace the tape free of charge should it go bad. In addition, the write-protect tab has been punched out on all cassettes.

In conclusion, the reviewer states he cannot justify the $24.95 price of the cassette. In reality, it is about the best deal on the market, since that price buys you both programs, resulting in about a $12.50 price tag for each Adventure: one a humorous beginner's Adventure, the other a Hi-Res color graphics Adventure.

Chris Pelley
Family Computers

PERSONAL BOOKKEEPING 84

Editor:

Thank you for your review in the November 1984 RAINBOW [Page 214]. It was very helpful in perfecting my *Personal Bookkeeping 84* (now *Personal Bookkeeping 2000*) program.

I have corrected all the problems the reviewer found in the program, and I am now offering the improved version for sale. In response to user requests I had already developed user-definable expense categories.

I completely rewrote the user's manual, giving examples for all entries, clarifying parts that others had a problem understanding and concluding with a six-page tutorial. This is why I am printing it on my word processor at this time, rather than having it commercially printed, so that I may improve any part immediately when a problem is brought to my attention. In any case, I am always glad to help out the user with any problems he or she may have. If you phone, please call in the evening or on holidays, when I am most likely to answer (and your phone bill is lower).

As is the case with all high technology, I can and probably will continue to improve this program and user's manual for the rest of my life, or until advances in computer languages render it obsolete; thus if I incorporated all the features I could think of it would never be released and it would benefit no one.

As they say in the aerospace industry, which was responsible for the great advances in computers, "there comes a point at which you have to stop planning and start production." After working on this program for over two years and making it better than others of its type on the market, the time had come to start production.

Jeffrey Blaufarb
AMDT-Stardancers

VIP CALC

Editor:

I just received my February 1985 issue of THE RAINBOW and was happy to read a review of *VIP Calc*. Having purchased *Super Color Writer* and *VIP Database*, I anticipated that *VIP Calc* would be just as good.

I already owned *Elite*Calc* and was ready to move up to something which provided a larger portion of the sheet on the screen. I purchased *VIP Calc* at RAINBOWfest in Chicago last year. I was unable to find anyone selling the program that had actually run the program, but I did find one willing to refund my money if I wasn't satisfied.

I read the documentation and was impressed. When I got back home, I loaded it up. Several of the things that the documentation said would work produced only error messages. When I attempted to set up the Byte benchmark sheet on *VIP Calc* by using the Replicate function, I continually got error messages indicating that I was out of memory (on a 64K machine). I tried contacting Softlaw but got no response. I finally used the MATRIX command to limit the size of the sheet to 25 x 25 (not something the documentation indicated was necessary) and was able to set it up without further trouble.

The reason I write is to tell you that I find nothing in the review and nothing in "Reviewing Reviews" which is inaccurate — but there is something missing which might help someone decide between *VIP Calc* and its competition. There is a reason that *Elite*Calc* and *DynaCalc* both mention speed in their ads. *VIP Calc* is four to seven times slower in recalculation times on the Byte benchmark than they are. Unless *VIP Calc* has done something different in the newest versions, that is the program's biggest deficiency. *VIP Calc* does have features the others don't, and they both have features *VIP Calc* doesn't. Unless I needed one of *VIP Calc*'s unique features, the speed of operation would make it my last choice of the three.

Paul French
Burlington, IL

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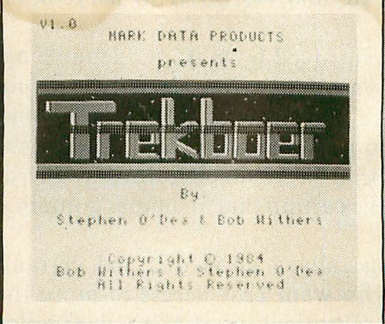

```
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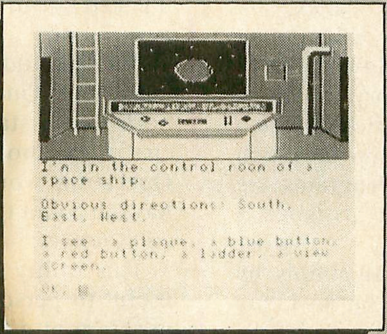

```
I'm in the control room of a
space ship.

Obvious directions: South,
East, West.

I see: a plaque, a blue button,
a red button, a ladder, a view
screen.

OK, █
```

This exciting hi-res adventure begins aboard the starship TREKBOER in the 21st century. Life on Earth is threatened by a deadly virus and your mission is to search the frontiers of space and return with a cure to save mankind from disaster. But how? Where? The name of your starship provides the first clue.

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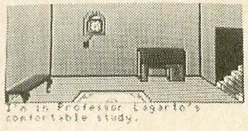


```
I'm in Professor Lagarto's
comfortable study.

I see: a roll top desk, an
oriental rug, an antique table,
a flight of stairs.

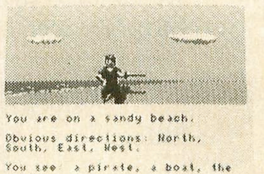
Welcome to the Calixto Island
Adventure.

OK, 0678
```

CALIXTO ISLAND

A valuable museum treasure has been stolen, can you recover it??? This is a challenging puzzle with an occasional twist of humor. You'll visit a secret laboratory, a Mayan pyramid and you'll meet crazy Trader Jack—all in living color and exciting detail. You will really love this hi-res graphic version of the classic Calixto Island Adventure. 32K required.

Rainbow—April '84 "It was enough to keep my wife and 8 year old son glued to the computer for an entire weekend and two week nights."



```
You are on a sandy beach.

Obvious directions: North,
South, East, West.

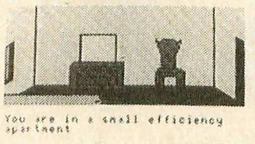
You see: a pirate, a boat, the
ocean.

OK, 0876█
```

SEA SEARCH

Get your shark repellant and scuba tanks ready! The graphics in this adventure are truly outstanding and the underwater scenes are unforgettable. You'll run into a pirate, a mermaid and some hungry sharks in this colorful and unique treasure hunt. 32K required.

Hot CoCo—April '84 "The fine graphics accent your imagination."



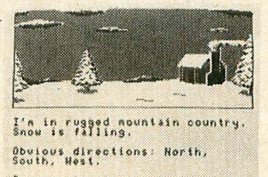
```
You are in a small efficiency
apartment

You see: an old brass bed, a
dresser, a wooden valet, a
closed window, a door.

OK, 0876█
```

SHENANIGANS

Countless legends tell of a magnificent Pot of Gold hidden at the end of the rainbow. Many have attempted to find the marvelous treasure but success has eluded them and it remains hidden to this day. You, as a dedicated adventurer, have determined to search for the fabled riches and succeed where others have failed. This one is great fun! 32K required.



```
I'm in rugged mountain country.
Snow is falling.

Obvious directions: North,
South, West.

I see: pine trees, a cabin in
the distance.

OK, 6870█
```

BLACK SANCTUM

Encounter the forces of black magic as you roam around an old 18th century monastery. You'll see all the evil locations in this spooky adventure; you'll love searching out and destroying the evil in this classic tale. A MUST for every adventure game fan! 32K required.

Rainbow—May '84 "It's the graphic screens that are the shining stars...Some of the best I've seen."

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Multiprogram Manager Provides Easy Access To Programs

The *Multiprogram Manager (MPM)* is a utility which gives the CoCo operator the capability of loading several BASIC programs into memory and then running each program separately, merging any two or more of them in any order and, if desired, saving the result as a single block of machine language which can then be reloaded. Multiple programs are thus readily available for manipulation without continually loading from tape or disk.

Operation is straightforward. *MPM* works by exchanging "program vectors" which are values in the low memory area of the CoCo which point to the memory locations of each program. It displays the memory locations of each program and allows you to select the location at which the next program will begin to be stored. Programs are stacked into memory from tape or disk and assigned a program number.

Any program may then be run off the menu simply by entering the program number. One or more programs may be `MERGE`d, `SAVE`d or `LOAD`ed in the same way.

MPM takes up approximately 2,000 bytes of memory in the low end of CoCo memory. The number of programs which can be stacked at any given time depends on the length of the programs and the memory available. A 32K CoCo can take up to five programs of average length; a 64K can handle double that. *MPM* will work on 16K only with short programs.

Initial documentation is fairly complete but needs improvement for beginners. While some extra work will clear up the difficulties, an operator not familiar with the program is likely to find certain instructions which are not immediately clear. For example: 1) the references in menu step 5 to the location of the most significant and least significant bytes are imprecise; 2) use of the same identification numbers for "Instruction Steps" and for discussion of menu items sometimes leads to uncertainty as to exactly what is being discussed if only the numbers are used in the reference.

A program error was encountered in the form of an unlisted line in lines 985 and 995. `GOTO 30` had to be changed to `GOTO 40`.

MPM could be improved by making filename handling consistent: Quotation marks either should be required for both initial stacking and also saving program blocks, or else they should not be required in either operation. Operation would be a little simpler, too, if one did not have to count to make certain that filenames contain exactly eight letters.

This utility is basically a good one and certain to be useful to persons who want easy access to more than one program at a time. Clarification of a few instructions and clearing up a couple of minor problems will make *MPM* a worthwhile tool for even more users.

(Dynamic Electronics, Inc., P.O. Box 896, Hartselle, AL 35640, cassette $14.95)

— Linda and Warren Napier

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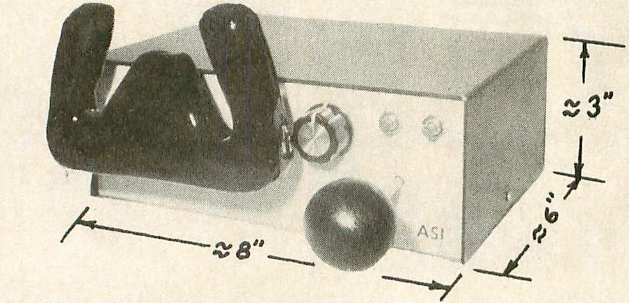

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One-Liner Contest Winner . . .

This familiar sight needs no explanation to THE RAINBOW's readers!

The listing:

```
0 PMODE3,1:SCREEN1,1:PCLS:CIRCLE
(128,195),128,0,.5:CIRCLE(128,19
5),118,0,.5:CIRCLE(128,195),108,
0,.5:CIRCLE(128,195),98,0,.5:CIR
CLE(128,195),88,0,.5:PAINT(3,190
),4,0:PAINT(13,190),1,0:PAINT(23
,190),2,0:PAINT(33,190),3,0:FORX
=1TO10000:NEXTX:GOTO0
```

David Sullivan
Auburn, NY

(For this winning one-liner contest entry, the author has been sent copies of both *The Rainbow Book Of Simulations* and its companion *Rainbow Simulations Tape.*)

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1983

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- Un-DISK will work even if you already own a disk but WHY BUY A DISK AT ALL?
- Un-DISK should be in the library of every serious CoCo user even if you own a disk says Frank J. Esser, independent reviewer for RAINBOW Magazine!

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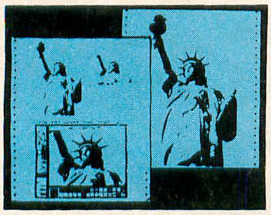

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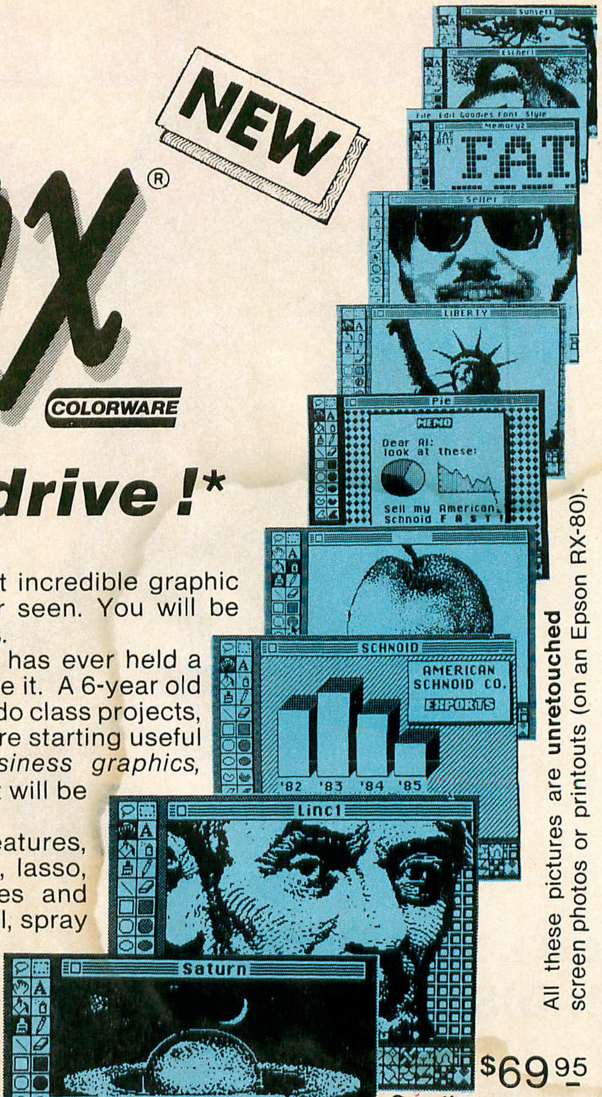
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FAT
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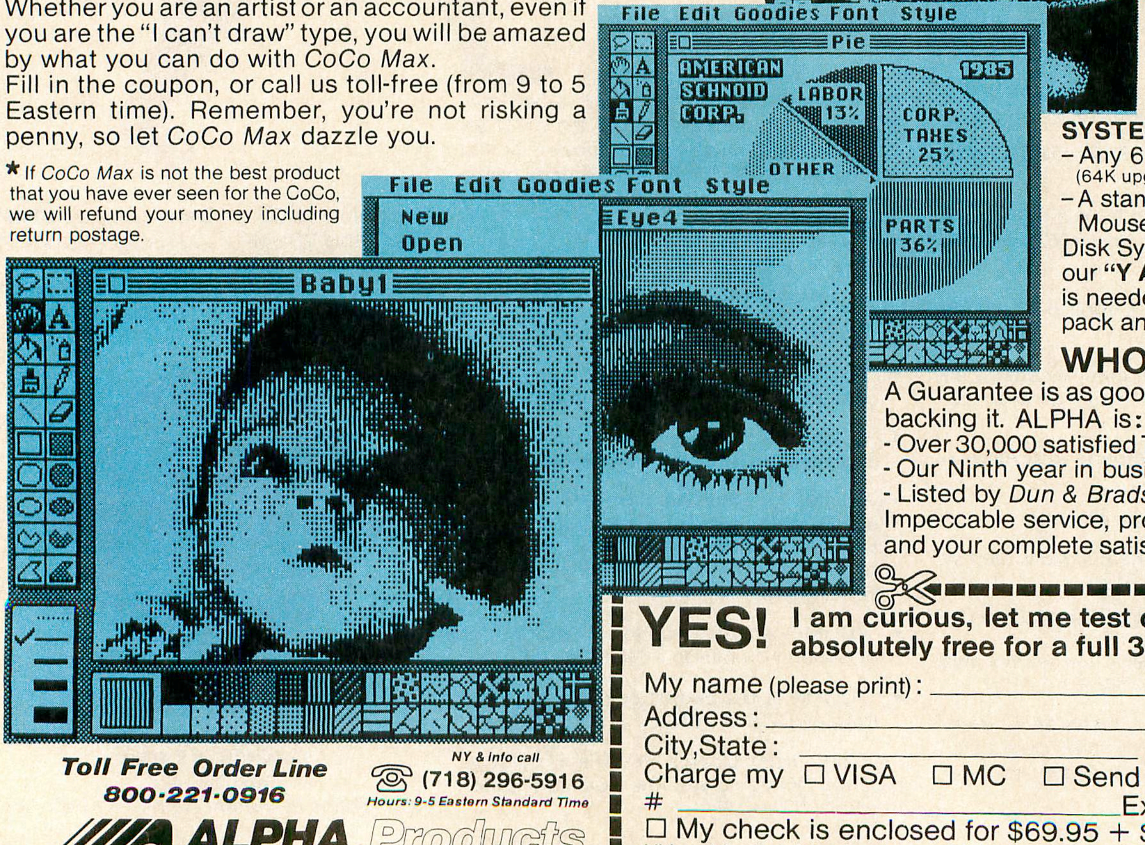
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Flip and Collapse With *Chipaway*'s Challenge

Watch it! Don't let that ball hit the bottom of the screen! Knock away as many chips from the wall as you can!

If you haven't already guessed it, this is a brief account of the game *Chipaway*, an excellent version of *Breakaway*. *Chipaway* requires 16K RAM (Extented BASIC not required) and either a joystick or paddle controller plugged into the right joystick port.

It is actually four games in one. Before beginning, you must select which options you want to play. The different options are Flip and Collapse. In the Flip option, the wall of chips flip over whenever the orange bouncing ball hits a bonus chip (more on these later). To enable this option, hit the ENTER key while you're on the title screen. To disable it, hit the ENTER key again. An 'F' will appear at the lower right-hand corner of your screen if the Flip option is enabled. The Collapse option causes any chips above the one just hit by the ball to collapse down a notch. To enable/disable this option, do the same as above, except hit the CLEAR key, and a 'C' will appear at the lower right-hand corner. Both options may be used at the same time. If you choose not to use either of these options, the chips will remain stationary.

Use the joystick to move the paddle at the bottom of the screen to hit the ball. Whenever the ball hits a chip, you receive a certain number of points, depending on the color of the chip. There are six different colored chips: green (10 points), yellow (11 points), blue (12 points), red (13 points), buff (14 points) and cyan (15 points). There are also three orange bonus chips that bounce back and forth horizontally across the screen. The lowest bonus chip is worth 50 points, the middle chip is worth 75 and the top worth 100.

Every time the ball hits the bottom of the screen, another letter in the words "You Lose" is added. However, each time you hit a bonus chip, another letter in the word "Bonus" will appear. When a bonus chip is hit and the word "Bonus" is completely spelled out, one letter is removed from "You Lose." When the words "You Lose" are completely spelled out, the game is over. If you'd like to play again with the same options, just hit the joystick button. If you want to pick new options, hit the Reset button.

Overall, *Chipaway* is an excellent game. It has high quality sound effects and great nine-color graphics. For all you people out there, especially fans of *Breakaway*-type games, *Chipaway* is sure to give you a challenge.

(Sigma Software, 14024 152nd Ave. S.E., Renton, WA 98056, cassette $5.95)

— David So

Library I Simplifies The Complex And Saves Time

It was when Tandy released the disk version of *EDTASM+* with its macro- and conditional-assembly capacity that it became possible to think of libraries of macros; that is, collections of pre-coded sequences to be called for complex or repetitive tasks. This package, *Library I*, is the first of a projected series of macro libraries to be issued by Sadare Software.

We may as well start by saying the package does well what it sets out to do. What remains is who will want it. The casual player of games and the neophyte struggling to master BASIC will probably have no use for it; and in view of Ed Juge's remarks at the last OS-9 Seminar (that the way to keep up with future versions of the Color Computer will be via OS-9), it may be that it comes too late to be of interest to the advanced assembly language programmer, too. That is a pity, for it is a serious effort to supply a need which all must have felt.

This first disk provides macros to perform 18 functions the programmer will have found tedious and exasperating to code in for himself: random and sequential disk I/O, tape I/O, moving data around in memory, etc. Macros to clear memory, clear the screen, print hard copy and emit sounds are given, too. There is also an equates file (DOS-IO/EQU) for all the standard ROM and DOS routines (this will save users enormous amounts of typing), and a file of subroutines for error processing, data display, Hex-to-ASCII conversion, etc. As succeeding disks appear, the user will find assembly language becoming more and more like the higher level languages in ease of use.

There is one peculiarity in the code: Stack operations are not entirely orthodox, in that registers are "pulled" from the stack in the same order they were "pushed" onto it. (PSHS A,B,X is followed by PULS A,B,X for example.) *EDTASM* is able to make sense of this, and pull the registers in the proper order, but it may be that other assemblers are not so forgiving. A programmer who adapts this disk for use with such other assemblers may find his programs crashing for this reason.

I have found no mention in the admirable manual of what the legal situation might be for one who uses this library to write code for sale; at the very least it would be courteous for him to include an acknowledgement in his source or documentation.

Library I is a very good start, and a real time-saver. If you can use such a package, you will welcome it. Maybe it didn't come to market too late!

(Sadare Software, P.O. Box 3891, Gaithersburg, MD 20878, requires one drive and Color Disk *EDTASM*, disk $24.95)

— R. W. Odlin

Keep-Trak Version 1.2: Quite An Enhancement!

The first release of *Keep-Trak* from The Other Guy's Software was reviewed in the September '84 issue of THE RAINBOW (Page 222) and this review will deal with the changes found in Version 1.2. First, congratulations to Joseph Nielsen and crew for responding so quickly to those who use their software. In the first review, I pointed out that the biggest flaw in their software was the lack of screen printouts of the material. They have taken care of this problem and I believe you will find the program much more useful.

Keep-Trak is a "double-entry" accounting system for the Color Computer. The system allows the operator to create account categories for assets, liabilities, income and expenses. Journal entries are compiled into four reports: a Balance Sheet, an Income Statement, a General Ledger and a Trial Balance. The program will handle 899 accounts and 2,350 entries on a 32K machine. It will work with a 64K system, but the program is not configured to use the full 64K. This system will only work with a disk system. (I suggest you see the review as printed in the September issue for more details on the program in general.)

Screen display is essential to this type program, and this is a welcomed feature. When the print option is selected from the menu, the operator is prompted with a "(P)rinter or (S)creen?". By selecting the 'S' option, the report or file is displayed on the the screen. When the screen is full, you are prompted to either continue with the report, or (E)nd and return to the menu.

Other additions to the program include a new code category for net worth. This is good for such items as retained earnings, capital stock, etc. You also have more "delete" options in that you can delete accounts, files and entries easier.

A very nice feature of the new version is the multi-drive selection. There is a new program on the disk which can be run to set the entire program up for two disk drives. If two drives are used, the program prompts the operator to insert the data disk into Drive 0 and the program disk into Drive 1.

There is also a new program on the disk to rename files or obtain a directory of the disk. This is a nice feature and comes in handy.

Keep-Trak is a very inexpensive accounting system that can be used by many businesses and homes. The new version makes this product even more useful. For those who have already purchased the first version, you can receive the latest version by returning your original along with $5. I cannot say that *Keep-Trak* is the best accounting system available for the Color Computer, but the quality and price make it a bargain and certainly worth considering.

(The Other Guy's Software, 875 S. Main, Logan, UT 84321, disk $19.95)

— James Ray

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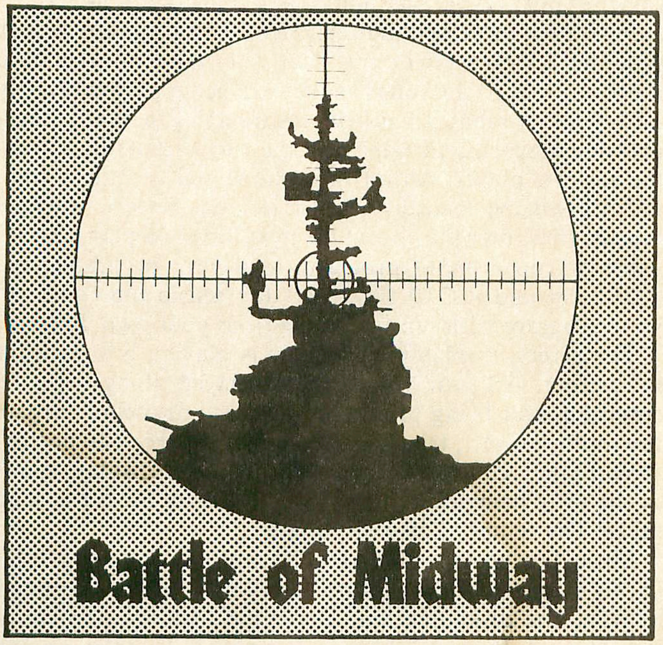

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Hear CoCo Sing With *MUSX*

MUSX is a new release from the good folks at GRAFX in West Mifflin, Pennsylvania. This piece of software turns your computer into an interesting, upbeat jukebox. The music played produces four voices at one time and each voice is programmed for various sounds. There are six disks in the *MUSX* series which can be purchased separately or as a group. Each disk contains 10 or more preprogrammed songs. These disks are for listening purposes only and cannot be used to generate songs other than those already on the disk.

MUSX is for disk operation only. Loading instructions are simple and the program automatically executes by giving you a listing of the disk directory which includes an interesting graphics display. The program requires about 10 to 15 seconds to set up. At first I thought the program was locking up as the disk drive continued to run; however, the program finally booted and worked well.

Operational instructions are simple. Each disk contains its own menu and you can select individual titles or select the "All" function and hear everything. The CLEAR key acts as an interrupt and returns you to the menu. The '9' key speeds up the tempo and the '1' key slows it down. This is a very interesting feature!

The instructions indicate that you can connect your cassette port cable auxiliary jack into your stereo or amplifier for increased musical effect. This program cannot generate a stereo effect and does not claim to. You can, however, record the songs as they are being played directly into your computer cassette by inserting a blank tape, pressing Record and removing the tiny remote jack from the cassette player. Adjust the volume and the music from *MUSX* will be recorded. Try this idea! Record a whole tape of computer music and the next time you play a BASIC game or run a BASIC program, load your program, type `MOTOR ON` and `AUDIO ON`, insert the music tape and run your program with music coming from your own TV!

The screen display while music is playing is somewhat interesting. All four voices are displayed along with the type of sound being produced. The sounds include organ, sawtooth, pulse 1, triangle, sine and RSquare. The bottom screen gives you the memory point, clock display, name of the song being played and the number of bytes the song takes. The tempo is also displayed.

Since the ads for GRAFX do not list the song titles in this magazine, I thought perhaps you would be interested in what the disks contain. Disk One includes pop songs like "Ghost Busters," "Mary Poppins," "Fiddler on the Roof," and show themes like "WKRP," "Happy Days," "Cagney and Lacey," "Twilight Zone" and "Hart to Hart." Disk Two contains a commercial medley, "Green, Green Grass of Home," "9 to 5," "Go Away Little Girl," "Theme from The Love Boat," "Theme from Dynasty," "Angela" and the classical "Masterpiece." Disk Three contains "Four Leaf Clover," "Close Encounters Theme," a Beatles medley, "Country Roads," "Laura's Theme," "William Tell Overture," "Joplin (The Entertainer)" and a Bach melody. Disk Four is a classical disk with "Prelude," "Gavotte," "Musette," "Minuet," "Hooked on Classics," "Trumpet," "Coronet" and others.

MUSX is a fine program for those who are into music on their Color Computers. The price is fantastic at $13.95 each or the entire set of six for $50. Unfortunately, I did not have disks Five and Six to review. However, Disk Five is advertised to include easy listening, and Disk Six is a Christmas music disk.

(GRAFX, P. O. Box 254, West Mifflin, PA 15122-0254, disk $13.95 each or all six for $50 plus $2 S/H)

— J. D. Ray

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All programs require a minimum of 32K and 1 disk drive but will take advantage of 64K and multiple drives. Each package features a hi-res 51 x 24 black on green screen. 16K versions available without hi-res screen. Specify 16K or 32K versions when ordering. Future integrated packages will include: Inventory Control, Sales Analysis, Accounts Payable.

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CRYPTON: A Fortress For Your Secrets

One of the problems you will face when using your CoCo for business purposes is data security. Imagine if you will, someone accidentally or intentionally getting hold of one of your disks and winding up with the names and addresses of all of your customers, or perhaps your payroll or general ledger files. Needless to say, this could be damaging to your business.

CRYPTON is a machine language utility program that will solve your data security problems. Before I describe how it operates, let me give you a little technical background on it.

CRYPTON is based upon the Playfair two-dimensional digraph substitution cipher. This cipher, or method of encryption, uses a 25 character key-phrase for encrypting data, and results in somewhere in the neighborhood of 10 to the 25th power possible combinations. *CRYPTON* uses a four-dimensional digraph and a 256 character key-phrase, which results in 10 to the 506th power possible combinations. For those of you who don't like scientific notation, that's a '1' followed by 507 zeros! If you would try to break this cipher at 10 tries per second, you should be able to come up with the solution within 70 years. In other words, if you don't know the key-phrase, forget about it.

When you `LOADM` the program, it auto-executes and you are presented with the one and only menu. This menu, as well as all the other displays, is done in nice Hi-Res. There are only three menu options to choose from. One of them will display your disk directory on the screen, and it will highlight any files that have been encrypted. It will also highlight files that have been killed, but not yet overwritten. Another menu option will display on your screen the contents of a file. You can use this option to see just how good a job the encryption process has done.

The meat of the program is the final menu option, with which you can encrypt or decrypt your files. When encrypting a file you are prompted to enter a volume, page and line number. These numbers have nothing to do with the encryption or decryption process, and only serve as a reference for you to remember the location of your key-phrase. For example, the volume could refer to some book you have laying around, while the page and line numbers would refer you to the exact location in the volume where the key-phrase is located.

Once you have entered this information, you are prompted to enter your key-phrase, which can be up to 256 characters in length. Next, you specify the name of the file to be encrypted, and the file is then overwritten by the encrypted version of it. Decryption of a file merely reverses the above process, but the program first displays for you the volume, page and line numbers that you used when you encrypted it, before it asks you for the key-phrase. I thought this was a very good idea, since if you forget the proper key-phrase you used to encrypt the file, you've had it. Also, since the volume number only has meaning to you, someone with a copy of this program would still not be able to properly decrypt your data.

CRYPTON is a very straightforward and easy-to-use program. The encrypted files it produces are truly unreadable and appeared to contain a lot of random garbage. The program performed flawlessly at all times, and I was unable to detect any program bugs in it. The documentation, although skimpy, tells you all you need to know in order to properly use the program.

If you have been looking for a program such as this, I can't think of a better or easier way to go.

(First Coast Systems, P.O. Box 5396, Jacksonville, FL 32206, 16K Disk $24.95)

— Gerry Schechter

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One-Liner Contest Winner . . .

This program finds "palindrome squares": that is, integers which, when squared, produce numerical palindromes.

The listing:

```
1 N=N+1:S$=STR$(N*N):T$=RIGHT$(S
$,LEN(S$)-1):FORX=1TOINT(LEN(T$)
/2):IFRIGHT$(LEFT$(T$,X),1)<>LEF
T$(RIGHT$(T$,X),1)THEN1ELSENEXT:
PRINTN"SQUARED ="N*N:GOTO1
```

Stanley Townsend
Alturas, CA

(For this winning one-liner contest entry, the author has been sent copies of both *The Rainbow Book Of Simulations* and its companion *Rainbow Simulations Tape*.)

CoCo Communications Made Easy With *Color Connection II*

Computerware has filled the gap when it comes to communications while using FLEX or OS-9. Brian Lantz has written two programs that convert your CoCo into an intelligent terminal while using these advanced operating systems. No more do you have to bother using your Disk BASIC terminal program on CompuServe and then converting all of the files or programs you downloaded. When *Color Connection II* is used, it's already done.

Color Connection II is actually two software packages, (one for OS-9 and one for FLEX), but they are identical from a user's standpoint, so we will review them together. Both require a 64K CoCo, one disk drive, FLEX or OS-9, and a modem if you wish to communicate with the outside world.

Let me say first that the entire package is professionally presented, especially the 20-page instruction manual. It is clear and concise, reflecting the philosophy of the program. *Color Connection II* is menu-driven and reference to the manual is rarely needed.

To get started, the program must be copied from the supplied disk to the execution directory on your system disk. From that time forward, after booting your operating system, all that is necessary to activate the program is entering the command `CCONN`. You are immediately greeted with a master menu with the following options:

A) Change set-up file
B) Load set-up file
C) Terminal mode
D) Buffer menu
E) Return to OS-9
F) Special OS-9 features

The set-up files refer to user-modifiable parameters contained within the system. In addition to such normal parameters such as echo/half/full duplex, auto-line feeds, upload/download prompts and word-wrap, several nice features are added. A phone number is available for auto-dial modems. Maybe you can use it anyway without an auto dial modem for remembering the number of the BBS you are calling. Up to four macros are supported for logons, etc. Each macro can contain up to 40 characters. This file can be saved to your data directory and loaded with one command from the main menu which is option 'B.'

As a matter of personal interest, I was interested in the upload/download prompts. Both XON/XOFF and prompted uploads are supported along with a straight delay after each line if required.

The terminal mode refers to the normal operating mode of the *Color Connection II*. Immediately on entering this mode, you are advised of buffer status (whether the buffer is open or closed) and how much memory is left. Operation is at 300 Baud only and any Hi-Res screen you are using disappears.

A unique window approach is used to store all incoming data. One of the drawbacks of some other terminal programs is the processor expends so much time updating and scrolling the screen that sometimes data is lost. The *Color Connection II* pages the screen, but at any time you can use the arrow keys to move the window to a previous page. Data is still being received, but you have a 6K screen buffer to work with as far as reading the incoming data is concerned.

When in the terminal mode, control codes are used to control both the screen buffer and the receive buffer. By the use of predefined control codes, complete manual or automatic control of either buffer is possible.

From the buffer menu, you can view the received buffer, save it to disk, fill it from disk or fill it from the keyboard. The last option is great for saving valuable time transmitting messages on CompuServe.

With the special OS-9 features, you can execute any OS-9 command in your current execution directory from this menu. A few special options are also available, such as changing your data directory and increasing the buffer size. When booting *Color Connection II*, it only requests 5K of buffer space. The maximum is about 30K. The FLEX version allows a 42K buffer that is initialized when the program is called.

When the program arrived it was immediately put to use. A few bugs appeared in the upload/download protocol, but were corrected by a simple phone call. The program has been used extensively with good results.

One improvement could be made. Once, I managed to fill a 30K buffer and received no notice that the buffer was full. I'll admit that was an unusual situation, having one file that long (what's the term for being "long-winded" on a typewriter?). I would recommend *Color Connection II* for your communications needs.

(Computerware, Box 668, Encinitas, CA 92024, OS-9 disk $49.95)

— Dan Downard

One-Liner Contest Winner . . .

This letter guessing game shows you the alphabet and asks you to guess which letter the computer picked. If your guess is wrong, it gives you a hint by telling you which direction to go (left or right).

The listing:

```
1 CLS(3):FORA=65TO90:PRINTCHR$(A
);:NEXT:L=RND(26):PRINT@96,"PRES
SwhichLETTER":FORX=1TO26:INPUTL$
:A=ASC(L$)-64:IFA=L THENPRINT"RI
GHT! ";X;" TRIES"ELSEPOKE1023+A,
128:PRINT@128,"":IFL<A THENPRINT
"GO LEFT OF ";L$:NEXTELSEPRINT,"
GO RIGHT OF ";L$:NEXT
```

Paul N. Despres
West Wareham, MA

(For this winning one-liner contest entry, the author has been sent copies of both *The Rainbow Book Of Simulations* and its companion *Rainbow Simulations Tape.*)

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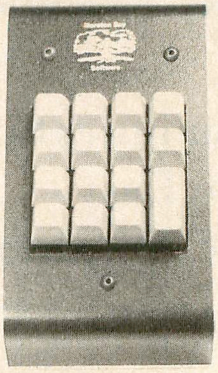

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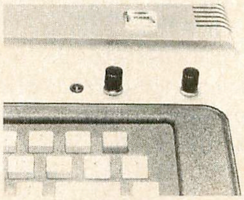

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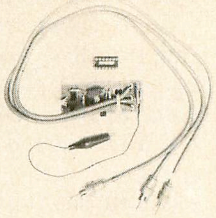

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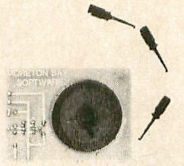

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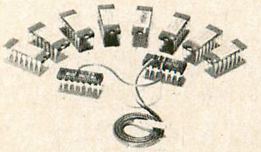

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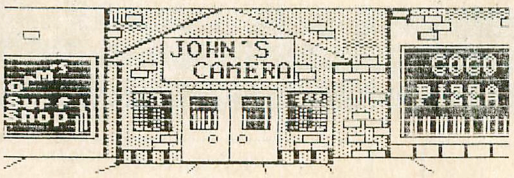

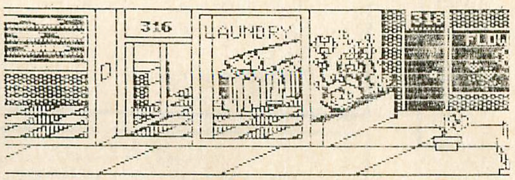

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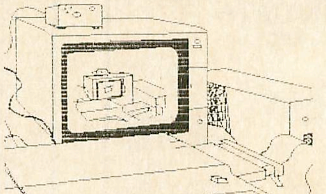

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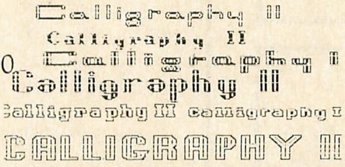

Calligraphy Disk II: 23
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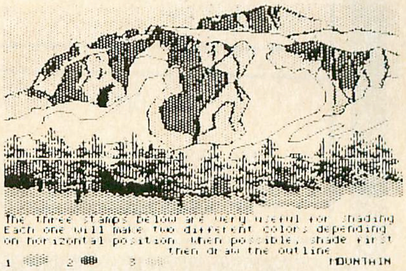

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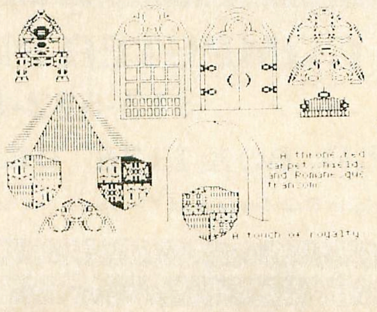
Adventure Disk II


A throne, red carpet, shield and Romanesque transom
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Look It Up With *The Standard BASIC Dictionary for Programming*

The Standard BASIC Dictionary for Programming is a worthwhile addition to your library. When I first opened this book, I quickly discovered that it is *not* written specifically for the Color Computer (or any specific computer). So I doubted that a book describing a "generic" BASIC could be of real value.

My doubt was soon dispelled, however, as my wife struggled to program on a T.I. computer owned by the school where she teaches. The utility of this book became apparent, as I will attempt to demonstrate in the following paragraphs.

The Standard BASIC Dictionary for Programming, published August 1984, is 220 pages in length. It comprises a dictionary of the BASIC statements, functions, commands and logical operators used in almost all BASIC dialects, and 10 appendices presenting a wealth of programming information.

To quote the author, John P. Steiner:

> "This book will give you fast access to: A dictionary of the BASIC language, a quick-reference syntax guide, a cross-reference to similar keywords in BASIC (related to all major brands of hardware), a wide range of programming tips and techniques, program conversion techniques that can easily be adapted to your needs, computer graphics display techniques, operation and preventive maintenance techniques and computer data and text file programming techniques."

Now, back to my wife. She had written a demonstration program for her school's T.I. computer, but she could not clear the screen. (As is so often the case, the computer manuals had been misplaced and could not be found.) She knew that our Color Computer recognized the keyword `CLS`, but the T.I. did not. Neither would it recognize any of the other keywords she tried. When I looked up `CLS` in *The Standard BASIC Dictionary*, I found cross-references to the keywords CALL CLEAR, CALL SCREEN, CLEAR, CLR and HOME.

Trying these, she found the T.I. recognized CALL CLEAR: a simple solution to a frustrating problem. Similar problems are common when modifying a program from one computer to run on another.

The dictionary includes the keywords from most computer systems — including the Color Computer, TRS-80, Apple, Atari, Commodore, T.I., IBM, Timex/Sinclair, North Star, Heath/Zenith and Osborne. Each keyword is identified by type (statement, command, function or logical operator); a complete functional definition follows (including typical error messages resulting from incorrect usage) with examples of correct usage. Finally, keywords performing similar functions are cross-referenced.

The 10 appendices provide discussions, tables, and charts of interest to everyone — from new user to experienced programmer:

1) Programming tips and techniques
2) Program conversion techniques
3) BASIC graphics techniques
4) Maintenance of microcomputers and peripherals
5) Data file handling
6) ASCII code chart
7) Base conversion chart (including decimal, octal and hexadecimal numbers)
8) Table of common error messages
9) Table of derived mathematical functions
10) Bibliography of BASIC source materials

Material is presented in a concise, easy-to-read style. Specific, practical techniques (modular program development and flow charting, for example) are offered — not vague, difficult-to-implement generalizations.

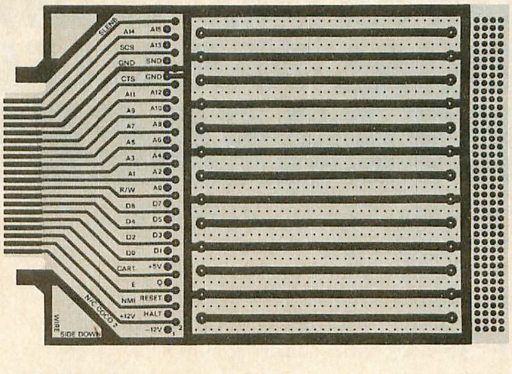
My only criticism of the book is that Mr. Steiner has not identified the computer using each keyword. Doing so would have facilitated program conversion by eliminating the trial-and-error techniques or additional research (in the appropriate computer manual) that are otherwise required.

But all things considered, *The Standard BASIC Dictionary for Programming* is a useful, well-written book.

(Computer Associates, Box 683, West Fargo, ND 58078, $19.95)

— Jerry Oefelein

6809 SYSTEM DEVELOPMENT



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CD Sort/Key-Extr Solves All Sorts of Problems

I am fanatical about having things in order. Many nightmares of mine have revolved around phone books being maliciously taken out of order or databases being vilely debased. As a result, a disk-based sort is a much needed commodity in my computer utility drawer. Fortunately, I recently received the *CD Sort/Key-Extr* package by Computize. The package includes a full disk sort that orders the data on several fields and an extraction utility that allows for the removal of key fields from databases.

The disk supplied with the program contains about 10 programs, most of which are support programs for the purpose of orientating the new user to the programs. All the programs run well, and the instructions do an average job of explaining the sort and its companion programs, with some minor difficulties in clarity. Most of these problems eliminate themselves as one uses the sample programs.

The sort itself works quite well. First of all, the user must define the input and output of the data that needs to be sorted. Next, a record length and a sort command set must be defined along with the type of sort (ascending or descending order). The command set is essentially the heart of the sort, and also the most valuable part because it allows the user to select what data positions, lengths, and priorities he or she wishes to use. A sort can be defined to sort each record, from the 80th record on, starting on each record's 40th character and continuing until its 45th character into ascending order.

An example of the kind of sort that *CD Sort* is capable of can best be described by taking the available disk capacity, dividing it by two (for the input and output files) and letting the imagination run wild. As long as the data is formatted enough to know where any given field is, then about any kind of sort can be implemented. As a demonstration of that power, I devised a sort that sorted first by ZIP code, then by last name, then by first name, then by city, then by state with minimal difficulty.

Another thing that amazed me was the speed of *CD Sort*. Including disk accesses, the program sorted even fairly large (500 record) files in under a minute. This is quite excellent considering the condition my drives are in and the disk access that was necessary to complete the sort.

The other program that is packaged with *CD Sort* is *Key-Extr*, a program that is designed for extracting defined data structures from data files (such as those of a database). Basically, this allows for only specified pieces of information to be extracted from an input file and written to an output file. Such a use would be removing all invoices that had the "outstanding balance" greater than $300 and outputting them for sorting under *CD Sort*. *Key-Extr* is probably not a program that you will use everyday, but it can be a potent utility when doing large database reports.

Overall, the two programs in this package are well-written and designed. Both may be interfaced by a BASIC program and used for your own programs. The documentation could use some improvement in clarity, but tinkering with the demo programs and reading the manuals gives the user enough information to successfully manipulate the two programs, and gives enough insight to write your own applications utilizing them for your own purposes.

I can advise anyone to buy the package who is in need of a full disk sort that will allow them to sort files many times larger than memory, and does the job both quickly and accurately among many fields. Since these two features separate this package from others on the market, this is what makes *CD Sort* special and should be the determining factor in purchasing a sort program. *CD Sort* has helped me get some of my largest files into order and can probably help you, too. Now if it could only do something for my poor phone book.

(Computize, Inc., P.O. Box 207, Langhorne, PA 19047, $34.95)

— Eric Oberle

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*Tri*Graf* And *Showmaker*: A Good, Low-Cost Graphics Design Studio Package

I must confess I am not especially into the graphics end of my CoCo, so when the review package from THE RAINBOW arrived, I felt a twinge of perplexity when I opened it to discover a graphics design studio package. But I dutifully loaded the cassette for a look. Two hours later, I was still creating various screen designs, with and without a joystick, and — dare I admit it? — thoroughly enjoying myself! Later, my 12-year-old daughter came in and took over the computer and *Tri*Graf*, so I retired to a nearby corner to compose this review.

The package consists of two programs, one (with backups) on each side of the cassette. The second of the pair, *Showmaker*, assembles, stores on cassette and displays in sequence the screen designs created by the first program, *Tri*Graf*. *Showmaker*'s hard copy documentation is all but nonexistent; it doesn't need to be any fuller, either. The program truly runs itself from step-by-step prompts within menu-driven routines, and there is an Instruction routine that can be called up at will. The actual work of creating the screens is done via *Tri*Graf*, the first of the pair, and examining it should and does occupy most of this review.

*Tri*Graf* is set up to construct backgrounds, designs, graphs and so on. The documentation suggests using it in conjunction with the Triad Picture's *Animator*; however, that program was not at hand for trying the combination out. *Tri*Graf* is systematically laid out, clearly and concisely documented and, given the hardware, produces results successfully and easily. The program has a machine language loader, entering the BASIC code behind a billboard containing red, yellow and blue patches for calibrating your TV or monitor.

The main menu offers three options: "Color Studio," which starts with a Help routine (consisting of an abbreviated set of directions from the documentation) from which the user may proceed, immediately if desired, to the editing screen; a secondary menu offering cassette I/O, a choice of color combinations (corresponding to `SCREEN 1,0` and `SCREEN 1,1`) and a return to the main menu; and finally, a general exit option.

The editing screen comes up with garbage (the documentation warns you of this and tells you that a single keystroke will clear it, which it does) and a single-pixel cursor. Once the screen is blanked, the cursor may be moved either via the keyboard arrows (which may be held for sustained motion or combined for diagonal direction) or a joystick. Single arrow strokes seem very slow, and are really intended for "fine tuning." Angles sharper than 45 degrees relative to the horizontal or vertical may be had by combining the two sets of arrows in different proportions.

Optional modes include Line, Write, Circle and Fill (`PAINT`, in effect). Line is set by entering a color number from one to eight (corresponding to the standard color selection) and entering 'L.' A line beginnng at the set pixel trails the cursor. The line(s) and resultant shape(s) flicker until either the joystick firebutton or ENTER is pressed, whereupon the flicker ceases, and the shape is "printed" on the screen. A closed shaped figure may be painted a specific color by positioning the cursor and entering 'F.' A word of caution, however: The figure must be closed in on all sides, or the "paint" will flow out and the screen will be lost in a partial hang-up. Here again, the documentation warns about this very carefully.

Circle 'C' draws a pixel-pointed circle in a preselected color, which can be expanded or contracted by single key strokes and moved by the appropriate arrows. It, like the other figures, flickers until the joystick firebutton or ENTER prints it permanently.

The Write mode is really the only one requiring a joystick. The joystick positions the cursor at the point on the appropriate line where the writing is to begin. Color (one through eight) and size (or "scale," as it is termed) are selected via prompts. You may then proceed to type a title or legend. The letters are boxy and not especially elegant; then again *Tri*Graf* is not a high resolution multifeatured word processor, either. They are certainly satisfactory for the purpose. Here again, the text flickers awaiting the "permanence" of ENTER.

Documentation, as may be gathered from previous references, is concise, to the point and very easy to follow. I found the program package essentially error-proof, with possible glitches anticipated and tended to in the documentation.

The last two pages of the booklet give step-by-step directions for setting up title and graphics screens.

*Tri*Graf* and its companion, *Showmaker*, are nicely thought through, carefully programmed and easy to use. At the price, they are well worth considering if you are in the market for a graphics screen designer.

(Triad Pictures Corporation, P.O. Box 1299, 134 Simders Rd., Sequim, WA 98382, $16)

— John Ogasapian

One-Liner Contest Winner . . .

Sunset over the City is a striking graphics display made with the help of the `PAINT` command and the "pattern poke" (`POKE 178, x`).

The listing:

```
0 PMODE4,1:PCLS:SCREEN1,1:CIRCLE
(126,65),40,3,.7:POKE178,2:PAINT
(126,52),,3:POKE178,1:LINE(0,60)
-(255,191),PSET,BF:FORA=0TO356:C
IRCLE(126,60),A,0,.4,0,.5:NEXT:F
ORA=1TO12:X=RND(75):Y=RND(50):Z=
RND(50):PSET(X+160,Z):PSET(X,Y):
NEXT:LINEINPUTA$
```

Robert Rice
FPO Miami, FL

(For this winning one-liner contest entry, the author has been sent copies of both *The Rainbow Book Of Simulations* and its companion *Rainbow Simulations Tape*.)

Grover's Number Rover Rates A Solid 'A' In Math

By Rick Cobello

The Children's Computer Workshop is an activity of the Children's Television Workshop. They have brought us *Sesame Street* for many years on public television as well as many other fine programs. They know children and what is needed for a successful computer program.

Grover's Number Rover is an excellent example of a well-designed computer activity. Any child who uses a computer will definitely know the likes of Grover. It is a basic skills game in the area of math. The game format offers interaction that focuses on skill building. The program is in cassette format and requires a 16K Color Computer with Extended Color BASIC. A short BASIC program is loaded into the computer. This program, when run, loads the remainder of the machine language routines. This initial loading takes a considerable amount of time for completion.

The title screen is a component of this as well as the initial menu selection. In field testing this program with young children, I found the time too long for them to wait. The title screen is pretty, but not of much interest to the children. The ideal situation is to take care of this before you are going to work with the child.

The main menu offers six selections in the area of math. After a selection, a second menu appears. This is to select the difficulty level for the child. Instructions are also an option. Short instructions are given for each game. *Grover's Number Rover* is for the 3- to 6-year-old age group. Difficulty level one provides problems with numbers from one to six. Level two includes numbers from one to 10.

The first selection is entitled "Twiddle Windows." Grover receives very capable assistance from the Twiddle bugs. Twiddle bugs are another creation of the Children's Television Workshop. In "Twiddle Windows," Grover opens a window for each of the Twiddle bugs on the ground. The child has the responsibility to get the Twiddle bugs up to the windows. The computer selects the number of Twiddle bugs standing on the ground.

The child must press the up-arrow to move each Twiddle bug into a window. For each one, the up-arrow must be pressed one time. When all the Twids are moved into the windows, the ENTER key is pressed. If they have not all been moved into the windows, Grover will shake his head and the child may try again.

There is no limit on the number of incorrect responses. This does not pose a problem because this is intended to be a family activity. The parent is the controlling factor for incorrect responses. If the child is correct and all the windows are filled, a number pops up on the Rover and tells the child how many Twids are in the window. Grover flashes the Rover lights and the windows begin to close. When the last window closes on the Twiddle bugs the game is ready to be played again.

An important educational method occurs in this first game and is followed throughout the remainder of the

- DRIVE REPAIRS - MONITOR - PRINTERS - COMPUTER REPAIR - UP GRADES - DRIVE REPAIRS -

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activities. The child receives positive reinforcement on three different occasions. The correct answer is stressed in a manner that is paced appropriately for the intended age group.

The CLEAR key is used to return to the menu at any time. The second selection on the menu is called "Twiddle Numbers." This is a number matching game. A number is presented on the side of the Number Rover. The child is to find the corresponding number on the keyboard. When the correct number is found, the ENTER key is pressed and the number appears on the Number Rover.

The third selection is "Twiddle Counting Time." The computer selects a number of Twiddle bugs and sends them scurrying across the screen. The child selects the proper number and presses ENTER. If incorrect, Grover shakes his head and another chance is given. If correct, the Number Rover will pick up each Twid and put it on the Rover.

"Twiddle Adding" is game number four. An addition problem is shown on the side of the Number Rover. The child must add the numbers and enter the correct answer. In this case, there are two ways to enter an answer. The right-arrow key may be used to enter the parts of the problem. An example would be helpful. If the problem is 2 + 1 = ?, the right-arrow key is pressed two times for the first section of the problem. The ENTER key is then pressed and two Twids zip into the Rover. The two will change color and the next number may be entered with the arrow keys. If the incorrect number of Twiddle bugs is entered, they will run back off the screen so the child may try again. The second method for entering an answer is pressing the correct number from the keyboard. If right, the Twids jump right up to the Number Rover.

The CLEAR key returns us to the main menu where choice five is "Twiddle Away." The same procedures are followed as in "Twiddle Adding"; the only difference is the down-arrow is pressed each time the child would like to take away a Twid. Other than that, the program operates the same.

The last selection on the menu is just pure fun — no rules to follow and no problems to answer. "Twiddle Play" is a game where the child makes up the rules. The left- and right-arrows move the twiddle bugs on and off the screen and the up- and down-arrows pick up and drop down the Twids. This is a fun activity when the work is completed. It is a refreshing end to a hard session working on math.

The package also contains a 16-page parent's guide to using the program. It is well-written and easy to understand. The manual also provides some follow-up activities to use when the child has completed the computer activities. This helpful addition makes the most use of the material presented.

Grover's Number Rover has all the elements of a fine computer program. The capabilities of the computer are utilized for a unique presentation of a common topic. This is one of the strongest aspects of the program. It meets all the criteria for a superb educational product for home use.

(Radio Shack stores nationwide, Cat. No. 26-2522, 16K ECB, tape $19.95)

MUL-T-SCREEN

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Color Checkbook Keeps Finances In Check

Spectrum Projects is selling a very good program for those of us who can't or don't want to handle balancing our bank accounts. This little utility will allow anyone with at least a 32K cassette-based CoCo to save on their aspirin bill.

To use the program, you simply `CLOAD` it into Color BASIC and then type `RUN`. After that, all that is needed is to replace the program tape with a data tape, and follow the menus to use any of the features of *Color Checkbook*. These features include: Display Checking; Search Checking; Display Savings; Display Balances; Print A Check; Print Listings; Edit, Delete or Enter New Listings; Save New Data; and Help.

Under Display Checking, you can scan and display all checking entries, or just the last 10. A very useful option is Search Checking. With it you can search for any string, such as to whom the check is written, the date of the check, a check number, or a specific amount. This is nice in case there is question as to whether you've paid a certain monthly bill this month.

Another option is Display Savings. This is similar to Display Checking, but will print the savings account entries in only one fashion: 10 at a time. The Display Balances will show your checking and savings account balance, which is not so great in and of itself, but it will also make sure you know when you are in financial trouble by sounding a repeating tone until you return to the main menu.

One of the more interesting options is Print A Check. With it, you and your printer, set at Pitch 12, can fill out a check without a single unreadable word or amount. Print Listings will provide a listing similar to what you get from the bank at the end of the month, with you specifying the start date.

The most used options are Edit, Delete and Enter New Listings. While in this option, you can enter, edit or delete a check or savings entry, or change account information such as the user's name, checking account number or savings account number. The only drawback I see in the entire program comes in this section. In order to edit or delete, you must enter the date and the exact description of the check or savings entry. This requires an extra step to go back to Display Checking or Savings and remember, or write down, the data needed.

The final option is Save Data to cassette when you finish for that session. There is also a quite adequate calculator included in the program. As for the instructions, they are very well done and include such niceties as "How to customize *Color Checkbook*" and "More help!" which is a section telling you how to contact the company which developed the program, FOXX Software.

In general, I must say that even though there are drawbacks to the program, it is all one needs to take charge of his or her finances. Now all we need is a disk version.

(Spectrum Projects, Inc., P.O. Box 21272, Woodhaven, NY 11421, or P.O. Box 9866, San Jose, CA 95157-0866, 32K/64K, tape $29.95 plus $3 S/H)

— Jim Sewell

BASIC COMPILER

MLBASIC 1.0 - BASIC COMPILER

WASATCHWARE is pleased to introduce what we feel is the most comprehensive BASIC Compiler available for the Color Computer. This BASIC compiler, called MLBASIC, is for programmers who want to create machine language from BASIC programs. Written in machine language, MLBASIC will prove to be the most powerful utility on your shelf.

COMMANDS SUPPORTED

```
1. I/O -Commands
     CLOSE    CLOADM   CSAVEM   DIR      DRIVE    DSKI$
     DSKO$    FIELD    FILES    GET      INPUT    KILL
     LSET     OPEN     PRINT    PUT      RSET

2. Program Control Commands
     CALL     END      EXEC     FOR      STEP     NEXT
     GOSUB    GOTO     IF       THEN     ELSE     ERROR
     ON..GO   RETURN   STOP     SUBROUTINE

3. Math Functions
     ABS      ASC      ATN      COS      CNV      EOF
     EXP      FIX      INSTR    INT      LEN      LOG
     LOC      LOF      PEEK     POINT    PPOINT   RND
     SGN      SIN      SQR      TAN      TIMER    VAL

4. String Functions
     CHR$     INKEY$   LEFT$    MID$     MKN$     RIGHT$
     STR$     STRING$

5. Graphic/Sound Commands
     COLOR    CLS      CIRCLE   DRAW     LINE     PAINT
     PCLEAR   PCLS     PLAY     PMODE    PRESET   PSET
     RESET    SCREEN   SET      SOUND

6. Other/Special Commands
     DATA     DIM      LLIST    MOTOR    POKE     READ
     REM      RESTORE  RUN      TAB      VERIFY   DLD
     DST      IBSHFT   LREG     PCOPY    PMODD    PTV
     REAL     SREG     SWP      VECTD    VECTI
```

WASATCHWARE believes that the 6809 based microcomputer is powerful enough to warrant such a compiler. MLBASIC is a BASIC compiler that allows structured programs (using SUBROUTINEs), full floating point arithmetic and other features not available with Interpreter Basic programs.

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Disk- $69.95
Both- $74.95

64K Required

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Submitting Material To Rainbow

Contributions to THE RAINBOW are welcome from everyone. We like to run a variety of programs which will be useful/helpful/fun for other CoCo owners.

Program submissions must be on tape or disk and it is best to make several saves, at least one of them in ASCII format. We're sorry, but we do not have time to key in programs. All programs should be supported by some editorial commentary explaining how the program works. Generally, we're much more interested in how your submission works and runs than how you developed it. Programs should be learning experiences.

We do pay for submissions, based on a number of criteria. Those wishing remuneration should *so state* when making submissions.

For the benefit of those who wish more detailed information on making submissions, please send a SASE to: Submissions Editor, THE RAINBOW, P.O. Box 385, Prospect, KY 40059. We will send you some more comprehensive guidelines.

Please do not submit programs or articles currently submitted to another publication.

Pro-Color-File *Enhanced* Version 2.0 — An Excellent 'Relational' Database

By A. Buddy Hogan

Pro-Color-File (P-C-F) was the first serious database management program that I purchased for my CoCo nearly two years ago. The program has been improved several times since then, other interactive programs have been developed in the *Pro-Color-Series* and now *P-C-F* has been newly released as *Pro-Color-File *Enhanced* Version 2.0.* The original *P-C-F* was reviewed in the June '83 RAINBOW (Page 208), and the first major revision was reviewed by Dan Downard in the June '84 RAINBOW (Page 233). Therefore, this review will deal only with features not previously reviewed.

Pro-Color-File requires a 32K Color Computer with at least one disk drive. *P-C-F* is actually a series of programs that allows you to designate your data fields, design the input/update screen(s), specify mathematical equations and design report and label formats. There are also programs to enter/update data, sort records, print reports and labels and determine which database formats are on the disk. Major new *P-C-F* enhancements include the following.

Define Equations

The feature that helps give *P-C-F* its legitimacy as a "relational" database management program is the ability to have two or more data fields determine by interaction the contents of another data field. This is accomplished by defining mathematical equations that specify the relationship between the data fields involved. The new *P-C-F* implements `IF-THEN-ELSE` conditional testing as an option when defining equations. This allows a conditional test to be made before an equation is selected.

The `ELSE` feature allows you to specify the number of equations to be skipped if the condition is not met (equations can also be skipped after an operation is performed). `IF-THEN-ELSE` may be used to compare words (or other strings) as well as numbers. Conditional comparisons can be made using =, <>, <=, >=, < or >. These conditions can be specified for entering/updating records or for the posting routine, or for both.

Text Files

You are now asked before a report is printed whether you want to create a text file with the report. After a filename is entered, the report is stored as an ASCII text file for use by a word processor, for transmission over a modem or for use by the spreadsheet program *DynaCalc*. The text file can be stored on tape or disk. This process works in reverse for storing spreadsheet data as *P-C-F* records. This means you can now read into *P-C-F* an entire ASCII-stored spreadsheet and rewrite it to a direct access file, storing each *DynaCalc* row as a separate *P-C-F* record. The limits for using this new feature are that your *DynaCalc* cannot have more than 15 columns and no more than 100 rows and each row cannot be wider than 255 spaces.

Features

1) The printer Baud rate may be specified or the rate may be maintained at the default value of 600. The same editing feature allows you to have the program add a line feed for those printers that need it when reports are being printed.

2) Quick access to a common menu is now provided when using the Add Records and Update Records features. You can add a new record while reviewing records or review records just added, both without going back and entering several selections.

3) Multiple labels may be obtained by specifying the number of labels to be printed for each record. Tab settings may also be set for data that needs to be spaced in from the left margin of each label.

4) Machine language editing features are included in the new *P-C-F*. Auto-key repeat and keyboard "click" make the program even more user-friendly than before.

5) You may create up to 16 different indexes (sorts) for each database (for example, an Accounts Payable database might have indexes by payee, by vendor code, by state, by ZIP code, etc.). These indexes can then be revised whenever data is added, updated or deleted from the database. All programs can access any or all of the indexes while being used.

6) *P-C-F* makes abundant use of error trapping routines

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RAM-16 comes with a cassette tape containing a test program that tests all RAM-16 functions and a utility program that lets you use it with your basic programs.

RAM-16 comes with a complete Users Manual containing a circuit diagram and applications information.

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to allow you to recover from a mistake without losing data.

7) You may enter a password of up to five characters to protect input screens and reports from unauthorized access.

8) Records may be "posted" by entering the current data for the field(s) that you specified and then have *P-C-F* post that data in each affected record in the database. This feature saves all of the time that would be required for manual posting by you know who.

Documentatiom

The new *P-C-F* documentation is supplied in a very attractive 8½ x 11-inch, three-ring, vinyl-covered binder. The 75 pages of documentation include both an index by section and one by topic for ease of looking up instructions. The manual is logically sequenced and takes the user through each feature in an orderly and thorough manner. Each option is discussed in enough detail for even a first time database user, but the manual also includes an expert user's section as well.

Also included are two sample databases with all of the formats and screens defined so you can refer to these as you set up your own database. As the use of each feature is explained, an example of the finished product is provided. The manual also describes each file that is on the *P-C-F* system disk and how it is used. This will be a help to those who want to customize the database for their own applications. The manual even comes complete with a few first edition typographical errors. I can honestly say that I have not seen a better presentation of documentation for a CoCo program than is provided with *P-C-F*, both for appearance and content.

ADOS ENHANCED, EPROM-ABLE DISK BASIC

Now, you can supercharge Basic with an impressive array of extra features WITHOUT sacrificing compatibility! ADOS is compatible with virtually 100% of commercial software. Customizing utilities are provided to allow user-defined command abbreviations, baud rate, step rate, tracks per disk (35 or 40), support of double-sided drives, and more. After customizing ADOS, you can have it burned into an EPROM that plugs into the Disk Basic ROM socket, or just use it in RAM as a 64K disk utility. (EPROM + burning will cost about $20--we provide information concerning how you can have this done.) Features include: • repeat and edit of the last direct-mode command • 26 definable control-key abbreviations • automatic line-number prompts • DOS command • lowercase command entry (a fine complement to a Lowerkit or PBJ WordPak) • COPY (filename) to (drive number) • AE error override option • RAM command (64K) • RUNM command • text echoing to printer • ML monitor • text file scan • enhanced directory • error trapping • hi-res text utility included (42, 51, or 64 characters per line)

"I could not find any software that would not run under ADOS."
The Rainbow, December 1984

"ADOS scores 98+. For a product as complex as a DOS, that's pretty close to the theoretical limit...Having been burned on software which didn't mesh with Disk Basic 1.1, I was wary at first. Now, I use ADOS with complete confidence."
Color Micro Journal, February 1985

Disk . . . $27.95

THE PEEPER ML PROGRAM TRACER

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Disk . . . $23.95 **Tape . . . $21.95** **Assembler source listing . . . Add 3.00**

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Tape . . . $21.95 (16K required) See July '83 review.

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More on the Way

This reviewer has it on good authority (the author) that by the time you read this review, a new program will be available to allow you to perform tedious and repetitious database tasks (such as printing reports) by pressing a single key. *SIMON* will work with any BASIC program. You just "teach" it by entering all of the inputs and then it will execute these same inputs whenever invoked by a single key command.

Support

At the risk of sounding a bit gushy, I must say that I have never encountered a business person (computer related or otherwise) more willing to personally assist his customers with understanding and getting the most out of his products than Dennis Derringer. He has always been available, extremely patient and, more importantly, willing and able to provide the assistance that is needed. He puts his phone number in the manual and encourages you to call if you have a problem.

Additional support is provided by a national *Pro-Color-File* Users Group in Wisconsin established by Jorge Mir, a longtime contributor to the THE RAINBOW. This group is not affiliated with Derringer Software. A quarterly newsletter is mailed to members that includes useful hints, program enhancements, answers to questions and utilities. The December '84 newsletter indicates that the group has grown to over 200 members. A listing of databases developed by members is maintained by the group so you may consult another member who has already designed a database to perform a task that might meet your needs. Jorge says this may develop into a library of *P-C-F* database applications available to members. Information on user group membership is included with each copy of *P-C-F*.

Derringer Software has made a valuable contribution to the CoCo community with *Pro-Color-File*. It is an excellent program that I recommend without reservation. When I bought the original *P-C-F* two years ago it cost $79.95; today the new *P-C-F* costs only $59.95 — and is a super bargain. (Owners of the original *P-C-F* can get the new one for $15 plus $3 S/H.)

(Derringer Software, Inc., P. O. Box 5300, Florence, SC 29502-2300, $59.95 plus $3 S/H)

One-Liner Contest Winner . . .

This program, for disk users who also have an Epson FX or RX printer (or Gemini or Panasonic printers), prints a disk directory in very small type using superscripts, short line feeds and elite type.

The listing:

```
10 POKE150,1:PRINT#-2,CHR$(27)CH
R$(77)CHR$(5)CHR$(27)CHR$(83)CHR
$(0)CHR$(27);"1":PRINT@129,"INSE
RT DISK YOU WANT PRINTED.
 hit enter":INPUTA$:POKE111,254:
DIR:PRINT#-2,"FREE  ";:A=FREE(0)
:PRINT#-2,A
```

Michael R. Patrick
Louisville, KY

(For this winning one-liner contest entry, the author has been sent copies of both *The Rainbow Book Of Simulations* and its companion *Rainbow Simulations Tape*.)

Downland Will Keep You Coming Back For More

This new Radio Shack game might be subtitled "Mario's Underground Adventures" since the men and sound effects bear a striking resemblance to that classic game, *Donkey Kong*. There the similarity ends, for here our old friend has walked into a cave and has been trapped by a rock slide. We are presented with a cut-away view showing the floor, ceiling, some ledges and stationary ropes. Scattered about are diamonds, bags of gold and keys.

Scattered about are diamonds, bags of gold and keys.

This is no ordinary cave. From the ceiling drips an acid so corrosive that the merest touch causes instant disintegration, while crushing boulders keep tumbling down. The object is to avoid both acid and rocks while scoring points by gathering the treasures and keys. Why keys? These are magic keys, causing doors to appear where previously there were none, leading from one chamber, or section of a chamber, to another within the cave. In all there are 10 separate rooms, and several are subdivided into upper and lower sections.

Each chamber has a time limit, shown in the lower-right on the screen, and when the clock hits zero, a poison bat takes flight. When the bat is loose, there is a slim chance that you will be able to rush to an exit before it strikes. Once killed by the bat, you get some extra time, but of course, one fewer man. You have a total of four men, with no possibility to earn more.

To play the game, you run along the cave floor jumping up to grab a treasure, timing the jump carefully to avoid leaping successfully for a treasure only to be struck by a boulder or acid drop. Fortunately, on the first few screens, climbing a rope provides safety from these two perils, and the proper technique for running jumps onto the ropes is quickly mastered. Once on a rope, you can climb, swing out to the side to grab a treasure, or take flying leaps from one rope to another or onto the ledges or footholds carved in the walls. Positioning at the start of a jump means everything: climb too high before jumping and splat! — instant death; too low and you miss your target.

Although in the early screens the acid drops fall harmlessly beside the rope, the acid can strike while you are in the air, so timing is always important. In some of the higher level caverns the droplets are so close to the ropes that you must either swing out to the side to avoid the acid or jump onto the walls. Leaping from the walls back to the ropes is, I found, the most difficult skill to master.

Each chamber is different, and most present at least one new difficulty which may arise through placement of the treasures and ropes, where the acid gathers before dripping, or how the boulders tumble downward. Occasionally, you see a key in a portion of the room which is inaccessible for the moment. Only after obtaining a key in a subsequent chamber does a door open allowing its retrieval. All keys open doors (not necessarily leading out of the chamber you are in) so you may not see any results when a key is grabbed.

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RAINBOW
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A good rule to follow is if you know where a key is, find a way to get it. That may require doubling back through cave portions to reach needed keys. The very brave may try shortcuts which involve great flying leaps, but the more cautious among us take the long way around.

Part of the fun of the game is figuring out which key opens what door, so I'm giving no extra hints here, only the warning that if keys are not obtained in proper sequence, you can enter some rooms, but be caught without an exit and doomed to death from the poison bat (or hit Reset to start over).

Downland comes with a detailed booklet which assumes this is your first cartridge. Not only does it show how to load the ROM pack, it also gives a detailed explanation of game play, complete with a step-by-perilous-step description of how to make it through the first three chambers, plus hints on later ones. Believe me, this is useful, necessary help — without it, I'd probably still be trying to find a way to jump up the stairs in Chamber 1! Another aid is the pause feature — handy in any game — which allows you to stop as you pass through a door and study the layout before proceeding.

Is this a game for everyone? If you haven't yet gotten yourself a self-centering joystick, here's a good excuse to buy one because the moves necessary to leap from rope to ledge between the droplets and stop on the spot, or die trying, require a fine hand on the controls. With the standard Radio Shack joystick, our family (spoiled, it's true), by long use of a self-centering model, found the game frustrating. However, the combination of many screens, each with new problems to solve and the variety of skills required at each level, gives lasting enjoyment.

Downland has that elusive extra quality found in the best of games. Although it's complex, challenging and takes many hours to master, even players who never made it beyond the first screen found themselves coming back for more. The one player who spent hours to complete all 10 screens kept trying, unsuccessfully, to repeat that performance. This is a game you'll keep playing.

(Radio Shack stores nationwide, requires 16K and joystick(s), $24.95)

— Carol Kueppers

One-Liner Contest Winner . . .

In this musical one-line, you use the right joystick and its trigger to produce musical tones.

The listing:

```
10 P=PEEK(65280):A$=STR$(INT(JOY
STK(0)/6)+1):V$=STR$(INT(JOYSTK(
1)/2.3)+4):IFP<>254ANDP<>126THEN
10ELSEPLAY"V"+V$+"T15XA$;":CLSRN
D(7)+1:GOTO10
```

Michael D. Crabtree
New Bloomfield, PA

(For this winning one-liner contest entry, the author has been sent copies of both *The Rainbow Book Of Simulations* and its companion *Rainbow Simulations Tape.*)

Super Disk/Tape Utility Makes Moving And Arranging A Snap

Like its sister program, *Super Disk Utility*, *Super Disk/Tape Utility* suffers from its documentation, which is not clear in some places. The program is menu-oriented, but it needs some explanation up front to make it work for everyone.

Super Disk/Tape Utility has excellent potential for the programmer or just plain user. There are utilities on it which we all use once we get beyond shooting frogs or spaceships. I use a program to move something from tape to disk or vice versa almost every session at my computer. You can't avoid it, especially when you are working on several different levels.

I used the tape to disk and disk to tape function on this program with great success. I would like to see a utility for transferring an entire disk or tape without stopping, but I do like the way DSL has laid this function out by the file. It is also great to have the ability to check your disk directory while copying.

I encountered little or no physical difficulty with the program. The tape loaded quite well, and there seemed very few problems in that area. I do think the authors could have offered a little tutorial as part of the documentation. I believe the general public is not as knowledgeable as the programmers, and that has to be taken into consideration when merchandising a product or a program.

Incidentally, one of the more usable features of this program is a utility which permits you to load tape programs to disk so they are above the disk input and output buffers. Simply stated, some machine language programs on tape use addresses which are used in Disk BASIC for another function. The utility program on *Super Disk/Tape Utility* provides a loader program which relocates the tape programs when moved to disk.

In spite of the problems with documentation, I think you could learn to love this program; it has many features the serious computerist needs.

(DSL Computer Products, Inc., 4950 Schaefer, Dearborn, MI 48126, cassette $19.95)

— Howard Lee Ball

One-Liner Contest Winner . . .

Is it a plane? Is it a UFO? Or is it *Superbird*? You'll have to `GET` your `PUT`s together to find out!

The listing:

```
0 DIMV(10,10):PMODE3:PCLS:SCREEN
1,1:CIRCLE(128,96),30:PAINT(128,
95),2,4:GET(98,81)-(128,111),V,G
:FORI=150TO1STEP-1:PUT(I,81-I/9)
-(I+60,111-I/2),V,PRESET:NEXTI:D
RAW"BM158,95F12L13U16":DRAW"BM58
,58F15L17U20":CIRCLE(138,88),5,3
,.9:FORZ=0TO1STEP0:NEXT
```

Floyd Keirnan
Orange, CA

(For this winning one-liner contest entry, the author has been sent copies of both *The Rainbow Book Of Simulations* and its companion *Rainbow Simulations Tape.*)

Software Review

Castle Ragoona Takes You On An Adventure Twosome

Even when it comes to computer programs, you can't judge a program by its first bytes. *Castle Ragoona* had such wonderful potential when I first tried it. My children took it apart, action by action, and when they were through all that remained was an empty shell.

The program tape comes with two different Adventures on it. One side has *Castle Ragoona*, listed as 32K CLOADM, and the other side, *The Enchanted Village*, listed as 16K CLOAD.

The program tape comes with a single sheet of instructions, and an insert explaining a new loading procedure for *Castle Ragoona*. The original program was CLOADed, and a change was made to incorporate the auto-load feature (by Sugar Software) and an auto-start. The new tape of *Castle Ragoona* auto-loaded requires a 32K Extended memory CoCo.

There is only one copy of the program *Castle Ragoona* on the tape, however, having CLOADed the tape about 15 times, none of the loadings failed. Caution: The cassette's "recording lockout feature" is not in place — the holes in the back edge of the cassette are not punched out — you can erase or overwrite the program on the tape.

Castle Ragoona, from a technical graphics standpoint is very well-executed, but the Adventure content is sorely lacking. All scenes are in high resolution multicolor graphics, with half the screen reserved for program statements, entering commands and move directions. The other half shows 3-D scenes.

These scenes are well-coordinated, but after a short time you notice the "emptiness" of them. There are appropriate, well-orchestrated melodies and sounds. With good graphics, sound and communication techniques and a possible first-rate Adventure program, why has the author abandoned all those "Adventure techniques" that one would come to expect in a computer graphics Adventure?

The plot: A medieval castle looming in the distance. You enter at your own risk. There, you search the rooms for all sorts of things to help you "raise" your flag on the West Tower. All rooms (scenes) are in 3-D high resolution detail. In the Adventure, you come up against foes who can stop you and do you in — there are no clues, hints or help from the program; you're on your own.

You move through the castle by entering single letters for directions. The instructions tell you that you need only enter the first three letters of the verb and then the object (example PUS BOO for PUSh BOOkcase).

The problems: There is no random display of the room sequences. The sequence and room appearances do not change from one game to the next. The (dark) maze sequence is a fixed sequence — once you figure it out, the Adventure is all "downhill" from there. Here's an example "hint": If you drop an object on a maze room floor, it stays on the "floor" of that room, the next room and the next room, etc., and sometimes it disappears. The ending sequence to complete the Adventure is always the same procedure. There is no game-saving reloading feature.

While playing this Adventure, I couldn't help wondering if the Adventure would intensify and become more challenging. For a beginner, this Adventure may be a little too much; there are no hints or help. For the average Adventurer, this program could be dispatched in short order. And the advanced player might be insulted with the "primitive Adventure action." I can only venture a guess this program needs more substance.

It took my two oldest children, ages 14 and 10, about two hours to "break the Adventure." This amounted to playing about five games, and as of the writing of this review, they can complete the Adventure in under five minutes.

The other program (on the other side of tape) is entitled *The Enchanted Village*. I found this Adventure to be much more interesting. It is written in BASIC, with no auto-loading. There are several copies CSAVEd, and it loaded without problems. Its only fault appears to be the lack of interest the author took in presenting the title and introduction screen. The Adventure begins with its name and a question mark. The program is "asking you" to input with an ENTER keystroke to commence the Adventure.

The Enchanted Village plot puts you in a village; the screen is mixed with text and a small portion of the map of the village. Clues are given when you can peek at the whole map. You must get your copy through the Adventure. There are direction commands and simple verb commands to acquire your treasures. During the course of the Adventure, there is a nasty pirate, whose sole purpose is to steal your treasures. Play time could be as much as one to two hours; it depends on how active the pirate is.

The program is written in non-Extended BASIC, with graphics. Instructions are provided on the instruction sheet. There is no game-saving feature, and I cannot see a need for one in this game. The literature identifies the program as a "humorous beginner's graphics Adventure." The program has nice continuity. There are programmed random events, and you must do the "humane thing" to complete the Adventure. Both Adventures have no scoring and indicate when you have completed the Adventure.

While this program may be suitable for a beginner's Adventure program library, the other two groups (average and advanced Adventure player) may find it unsuitable as stated above. The cost of the program tape cannot be justified by its lack of Adventure content and there is no backup for *Castle Ragoona*.

(Family Computers, 4047 Bee Ridge Rd., Sarasota, FL 33582, 16K BASIC or 32K ECB required, $24.95)

— Stephan A. Brown

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Draconian Has Space Wars With All The Trimmings

If you're among the many who appreciate good space wars, you'll enjoy *Draconian* — an arcade-quality game by Tom Mix Software that proves such games will continue to thrive when original ideas and quality programming techniques are applied.

The object of the game is to destroy all of the enemy ships in an apparently infinite number of space sectors, each unique in the way the enemy ships are displayed on the screen.

When all the ships in that sector have been eliminated, a flashing arrow will appear at the top of the screen — indicating that the exit gate is open. Upon flying through the exit gate, the ship reverts to computer control and you are treated to a brief and colorful graphics display until you reach the next sector.

To the right of the play-action area is a smaller sector scanner, marking the location of each of the enemy bases in the area. The bases consist of several gun turrets, which are connected by beams. To eliminate an enemy base, you must destroy each of the gun turrets. When you've accomplished this, the base will disappear, freeing the captured astronaut inside. It is fairly easy to get rid of the bases in the lower levels because they do not fire upon you. As you advance, however, they become quite a nuisance.

Throughout the game, you'll have to keep an eye out for the dragons who seem to be radar controlled when it comes to tracking you down. They're out to destroy you, of course, before you get to them.

If that's not enough, you also have to worry about colliding with asteroids and space mines.

My one real criticism of *Draconian* is that every time you start a new game, you have to decide how many players are competing. That and the music on this particular screen are mildly irritating.

The real advantage *Draconian* has over the majority of space games is the variety of graphics that is demonstrated in each new sector, and in every aspect of the program. The level of difficulty increases with each new plateau and the challenge continues to build the longer you play the game.

(Tom Mix Software, 4285 Bradford N.E., Grand Rapids, MI 49506, tape $27.95, disk $30.95)

— Charles Springer

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Tough Sledding With Daring *Maze Runner*

How good are your reflexes? Have too many cups of caffeine destroyed your ability to act calmly under pressure?

Here's a nifty way to find out. It's called *Maze Runner* and it's an exciting arcade game which doesn't pretend to be anything but a fun diversion.

The author's premise of the game: Ytirrod, the Pretender (a bad guy), has built a series of fortresses. The good guys (you) have established an elite fighting corps to attack Ytirrod's forts. This group, the Maze Runner Corps, uses a vehicle called a Remote Controlled Attack Power Sled to attack the forts. If you saw *Return of the Jedi*, you know what these sleds are supposed to look and act like.

The reality: You maneuver a blip around the screen with your joystick avoiding walls and your own trail while trying to attack a cube inside an arrow in the center of your screen. If you bump a wall or hit your trail by reversing or crossing it again, you are zapped by a light beam shot from the center cube and destroyed by the ensuing explosion.

There are two levels, Trainee and Agent. The differences are that the sled moves a little slower in the Trainee mode and there are less obstacle walls thrown up to navigate around.

While this doesn't sound very exciting, it really is quite a challenge. As you succeed in destroying the center cube, the maze is redrawn, adding additional obstacles.

The graphics are very good. The highest resolution screen is used, eliminating the stair-stepping on the circular mazes, and the multicolored trails left by the sleds are interesting, but the author excelled with the sound effects.

As you guide your sled around, it generates a "Hummmmm" reminiscent of the sounds made by cars in the '60s before the days of catalytic converters and air pumps. Different tones are created as you change directions, as the engine works against the inertia previously created.

With the joystick centered, there is a satisfying idle of a high lift cam in a V8 engine joyfully glumping gallons of premium leaded. What this engine is doing in a flying rocket sled is something I don't know, but it is a satisfying sound.

My performance will relegate me to the perpetual rank of Trainee. The best I was able to do was the fourth level in the Trainee mode. Every venture into the Agent stage resulted in being zapped. Oh well, I'll let the advanced levels be conquered by my kids.

If you have a steady hand, quick responses and no guilty feelings from spending some time doing absolutely nothing constructive or educational, you'll enjoy a run on the *Maze Runner*.

(Harmonycs, 1747 Patricia Lane, Salt Lake City, UT 84116. 16K Extended BASIC required, tape or disk $14.95 plus $2.00 S/H)

— Bruce Rothermel

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Si Vous N'avez Jamais Vu *Dejavu*, C'est Bon!

One of the first games my children learned to play was "Memory," where pairs of matching cards are placed face down on the table and turned over two cards each time. When the cards match, they are removed and that player continues until he is unable to find any more pairs. The person who best remembers the location of the cards as they are revealed makes the most matches and wins. One reason this game remains popular, despite all the new games which are introduced each year, is that small children are often better able to remember the cards than adults, so all family members play as equals. Beargrip Software has brought this old favorite to the computer under the name *Dejavu*, (translated literally as "already seen").

In this version, you have the choice of playing the computer, or two people can play each other with the computer placing the cards in a grid pattern. You then have the choice of using joysticks, arrow keys or stating the grid position with letters and numbers.

The computer indicates in the upper-left corner whose turn it is and keeps score. The players can determine how large a grid they want, ranging from a six card field to a screen-filling 132. There are 66 pairs of drawings, which are nicely done and represent, for the most part, familiar objects.

The instructions for the program state that play terminates automatically when one player has an insurmountable lead. When we first sat down to test this program, we found it very disconcerting to have play end very abruptly before all the cards had been selected, and eventually became convinced that, especially in the two-player mode, a winner was being declared even when the score was close.

We also found that after one game, when we chose the play-again option, the computer declared a winner after only a few matches had been made, and sometimes immediately! This was very annoying. Since the game is written in BASIC it was not too difficult to change the program to reset the variables to zero after each game and permit play to continue until all cards are selected. After making these changes, the game was a lot of fun. We enjoyed being able to play a quick game without having to find someone else who had free time.

The specific changes which I made are as follows: In Line 21, add to the start of the line `NR=0:CC=0`, to reset these variables each time a game starts, and in lines 95 and 105 change the > sign to >=, and also in Line 105 remove the `*.75` to permit selection of all the cards in each game. These are "quick and dirty" fixes, and the authors may make more elegant changes. Obviously, if you have a version which plays properly, you would not want to make these improvements.

The instructions provided are clearly written, and explain both the play of the game and the use of the program. If, like my family, you have always enjoyed "Memory" and would enjoy a one player version, or if you are looking for a computer game for young children, keep this one in mind.

(Manufactured by Beargrip Software, distributed by Softmart, P.O. Box 61095, Raleigh, NC 27661, 32K ECB required, cassette $13.95, disk $15.95)

— Carol Kueppers

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One-Liner Contest Winner . . .

This one-liner simulates the well-known "Spirograph" game. If you don't like flowers, try changing the values of 'A' and 'B'.

The listing:

```
1 PMODE1,1:A=45:B=25:G=(A+B)/B:H
=(A-B)/B:SCREEN1,1:PCLS5:FORT=0T
O900:X=(A+B)*COS(T)-B*COS(G*T):Y
=(A+B)*SIN(T)-B*SIN(G*T):PSET(12
8+X,96+Y,7):X=(A-B)*COS(T)-B*COS
(H*T):Y=(A-B)*SIN(T)-B*SIN(H*T):
PSET(128+X,96+Y,8):NEXT:FORT=0TO
1STEP0:NEXT
```

Helio Diamant
Doar Na Chof Askelon, Israel

(For this winning one-liner contest entry, the author has been sent copies of both *The Rainbow Book Of Simulations* and its companion *Rainbow Simulations Tape*.)

Software Review

CoCo Video Titler Cues You Into The Program

Now that so many people have video recorders (and so many of them use a camera to film their "home movies" on tape), there's quite a bit of interest in ways to generate title screens inexpensively and easily. The old-fashioned "menu boards" that you attach stick-on letters to look just as tacky as they ever did; the title generators built into some color cameras now are rather limited, and a real character generator unit like the ones used by TV stations and cable operators will set you back $2000 or more.

Home computers like the CoCo can, with the proper software, generate good titles. (A local preacher where I live made up a BASIC program to put a title on the text screen — green square on black and all — and used it in his cable program.) *CoCo Video Titler* is an attempt to do this; it succeeds in one respect, but there is still some work to be done.

CoCo Video Titler seems to have been designed mainly for one thing — generating what is called a "leader." You may have seen the slate boards used in film production which have the name of the film, the scene being shot, what take is coming up and other details. You may also have seen what is known as the "SMPTE leader," which has the countdown to the two-second point and the once-per-second sweep. (SMPTE is the Society of Motion Picture and Television Engineers.)

In TV production, the actual program material on the finished tape is preceded by a title page identifying the program and a countdown. The countdown and two seconds of "dead air" let the station, network or whatever start the machine 10 seconds before air time and switch to the program just before it starts.

The title page tells what the program is (and can give other important details, like whether the program is in stereo, was recorded with Dolby noise reduction or if it is to be aired once and the tape erased) in case the actual reel or cassette doesn't have a label. *CoCo Video Titler* generates this title page and countdown.

To create the title page, the program has a separate editing mode. Several sizes of text (up to 14 lines of 21 characters each on a Hi-Res screen in `PMODE 3`) are available, but they cannot be mixed. Several background colors are available, and in some modes two-character colors can be mixed on a page. Only one page can be entered at a time. At any point you can switch to the display mode to see what the page will look like. The editing functions are adequate for the job, though not particularly advanced.

Once your title page has been created, you can start the recorder and put it on tape. You can leave the titles up for as long as you like; when you're ready for the countdown, press the space bar and *CoCo Video Titler* will run the countdown from the 10-second point. At the two-second point, the screen will go black; your program can start two seconds after this. (The best time to do this is when you're editing your footage into a finished program.)

It sounds like *CoCo Video Titler* could be used to generate titles for use within a program. It could, but the character set is rather poor. The capital letters look terrible (at least to me), and there is no lowercase capability whatsoever. This is my major gripe with this program — it's not something I think looks good enough for a program you would want to show.

(Spectrum Projects, Inc., Box 21272, Woodhaven, NY 11421 or Box 9866, San Jose, CA 95157-0866, $19.95 plus $3 S/H)

— Ed Ellers

One-Liner Contest Winner . . .

In Between is a game where you try to get as much money as you can by guessing whether a secret number will fall between two numbers you see. If you think it will, enter the amount of your bet; if you don't press ENTER for no bet. There is no standard of how much money you need to win, but if you run out of money the game ends.

The listing:

```
0 CLS:IFA=0THENM=500:A=1:GOTO0:E
LSEC=RND(13):D=RND(13):PRINT@5,C
;:PRINT@25,D:PRINTM"$":INPUT"YOU
R BET";B:M=M-B:F=RND(13):PRINT@4
7,F;:PRINT:IF F>C ANDF<D ORF<C A
ND F>D THENM=M+B+B:PRINT"WON":IN
PUTA$:GOTO0:ELSE PRINT"LOST":IFM
<1THENEND:ELSEINPUTA$:GOTO0
```

Jeff Roberg
Winfield, KS

(For this winning one-liner contest entry, the author has been sent copies of both *The Rainbow Book Of Simulations* and its companion *Rainbow Simulations Tape*.)

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Trivia Fever — A Fun Delirium

For over three years I have been fighting the invasion of games on my Color Computer. I have argued that the MC6809E should be saved from such meaningless tasks as saving the world from alien invaders and getting the frog back to the swamp. Then it happened; a game hit the street that finally grabbed me. *Trivia Fever* is not just the name of a game, it is also the name of a fun affliction.

Trivia Fever is one of the two games purchased for my Color Computer (*Zaxxon* was the first), and hopefully the first of hundreds of programs you will be seeing on the Color Computer to take advantage of a new licensing agreement with Tandy that allows a software house to include the OS-9 operating system on the program disk.

If you've been living in a cave for the past two years, *Trivia Fever* is one of the variations of the now famous game "Trivial Pursuit."

As is true of all of the trivia games, *Trivia Fever* is a competitive game to measure how much otherwise useless information you are carrying around in the memory banks of the original personal computer, your brain. What makes *Trivia Fever* different is that it comes on a disk as well as in the more conventional gameboard/scorepad format.

One of the advantages of *Trivia Fever* over the other trivia games is that you can handicap each player. There are a total of four ways to handicap more experienced "triviologists."

The first method is by requiring more experienced players to obtain more points in each category. The more experienced player may have to attain eight points per category, while a less experienced or younger player may only have to get one or two points.

Another method of handicapping is making the more experienced player answer more difficult questions. *Trivia Fever* comes with three different levels of questions. While Level 1 questions are relatively easy, the manufacturer tells us that Level 3 questions "almost require a Ph.D. in 'triviology'." My wife loves to make me play with all Level 2 and 3 questions. Level 1, as I said before, is relatively easy; I put a lot of emphasis on the word relatively. There are no easy questions in any trivia game; it is all a matter of your exposure to meaningless facts.

Next, you can handicap players by making more knowledgeable players have the computer select their five categories. There are a total of seven categories. Each player has to answer questions in only five of the seven categories. Having never paid much attention to professional sports, I find getting stuck with the sports category very humbling.

The last of the four handicapping methods is by varying the amount of time a player has to answer each question. Although this method is documented, I have found that players either know the answer within the first 10 to 15 seconds or they don't know the answer at all, and longer time limits are of little help in handicapping players. In five rounds of *Trivia Fever*, with a total of over 25 players, only one question was answered correctly after the 15 second mark.

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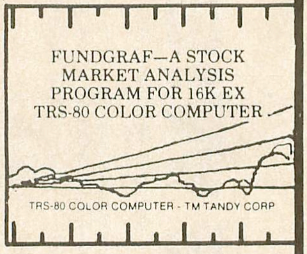

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If there is a downfall in *Trivia Fever*, it is the need for a game master. This person performs the task of operating the computer. The downfall is in that it is more fun to play *Trivia Fever* in a group than to operate the computer. The game master in *Trivia Fever* will soon know that feeling.

The game master is important though, and helps with some very important functions. Since there are a total of over 3,000 questions on the disk, there is no way to make sure the computer has not used a question unless there is a game master to keep track of whether a question is duplicated. The game master can also listen for anyone playing "from the sides," and disqualify any answers that are heard from the sidelines.

It seems that every possibility has been thought of when programming *Trivia Fever*. The game master is given the option to stop and/or restart the clock (someone ran to the bathroom), disqualify the questions (another player or a spectator exclaimed the answer), or get the computer's answer to the questions. There are no defaults, and the computer keeps a running total of everyone's standings.

The entire *Trivia Fever* package is professional and well-written. A player does not have to be a computer programmer to make the game run. Players don't have to even know what OS-9 is to use the program. (OS-9 has a start-up file that is automatically executed when OS-9 is booted. In the case of *Trivia Fever*, the game is automatically executed.) On the other hand, you must have some experience with life and trivia to effectively compete.

All in all, *Trivia Fever* is a welcomed addition to my Color Computer library, and if you have ever played a round of "does anyone know?" you will find *Trivia Fever* a welcomed addition to your software library as well.

(Available at Radio Shack stores nationwide, $29.95, manufactured by Professional Software, Inc.)

— Bruce N. Warner

One-Liner Contest Winner . . .

Here's an Easter surprise for you.

The listing:

```
1 PMODE3:PCLS:SCREEN1,0:LINE(0,0
)-(256,192),PSET,B:FORX=76TO1STE
P-1:Y=RND(4):CIRCLE(128,96),X,Y,
.5:NEXTX:FORA=1TO10:PLAY"O2L8CDL
10FL8EP32L8CDL4FP16L12EFL6GL8DEL
10FL4GP16L14GAL6BP32L14GAL6BP16C
L8EL10GFL2D":EXEC44539:NEXT
```

Kevin Speight
Bridgewater, Nova Scotia

(For this winning one-liner contest entry, the author has been sent copies of both *The Rainbow Book Of Simulations* and its companion *Rainbow Simulations Tape*.)

Software Review

Graphic Math Adventure Enhanced Bridges The Gap

Educational software is a much needed commodity for the Color Computer, and the Software Factory is trying to bridge this gap. A new release by Software Factory is *Graphic Math Adventure Enhanced.*

Upon loading the game, the child is greeted with a title page and a brief setup. Options are also given to set skill level and the type of operations desired, i.e., multiplication, division, addition, subtraction or any combination thereof. The game allows the player to move around by foot or by boat, and includes a Star Trek-like teleporter box. (For a more in-depth discussion of these basic features, see the original review in the October 1983 RAINBOW, page 252.)

Now, down to the new stuff. My major complaint about the original game was the slowness of the program itself. Luckily, this has been greatly improved. Another problem was the lack of rewards and encouragements for the child. An attempt has been made to improve this, and some musical rewards have been added, but a humorous graphics screen or activity would be nice.

The "Adventure" is now to the point where it doesn't bore the child, but it still falls short of being overwhelmingly entertaining. I believe the program could be improved further by adding an antagonist, or something to keep the child from wandering around the same area repeatedly. A little imagination could go a long way in this area.

Overall, I cannot give this program a whole-hearted recommendation, but I must admit I am glad to see the folks at Software Factory do listen to suggestions and have even made some improvements that are not mentioned. I feel this action shows dedication and support on Software Factory's part, and I think this is a good example for all CoCo software houses. Although this program is greatly improved, it still needs some minor adjustments before it becomes the best it could possibly be.

(Software Factory, 1333 Morgan Road, Bremerton, WA 98312, tape $21.95.)

— Eric Oberle

One-Liner Contest Winner . . .

This program uses an expanding sine wave to plot a series of circles; it gives a tubular effect.

The listing:

```
10 PCLS:SCREEN1,1:PMODE4,1:FORZ=
.1TO1.08STEP.01:CIRCLE(Z*200,SIN
(Z*22)*(Z*42)+100),Z*40:NEXTZ:FO
RK=1TO1000:NEXT
```

Mike Millemann
Jackson, NJ

(For this winning one-liner contest entry, the author has been sent copies of both *The Rainbow Book Of Simulations* and its companion *Rainbow Simulations Tape*.)

No-Delay Multitasking With *Spooler*

This concept of "free software" is great! Why didn't someone think of it sooner? Actually, the idea of free software has been around for at least two years. My brother obtained some very good software for his "brand X" PC (the one in the blue box) from a company in Florida. They may have been the first with the idea. Free software for the Color Computer is more recent, being offered by at least two companies.

I hope it is obvious the free software that is being described is not the same as that copy of *Kong* that was appropriated by devious means from a friend. That is piracy — a euphemism for stealing. "Freeware," although distributed by similar means, is different.

With freeware, the software is given to whomever wants it with the hopes that if people like and use the program they will send an appropriate donation. These terms are clearly stated on the opening page of the program. Several very good free programs are available this way. This particular review is about a program called *Spooler* which is a software print spooler for the 64K Color Computer. This offering comes from an organization called the CoCo Freeware Clearinghouse which has several freeware programs available.

For the uninitiated, a print spooler is a control and storage device that holds a file or program listing being fed to a printer. A spooler allows the use of the computer for other jobs while a long job is being printed. *Spooler* is a machine language program which uses part of the upper memory of a 64K Color Computer as a buffer to hold the information going to the printer. The program is compatible with Extended BASIC as well as Disk BASIC. When *Spooler* loads, it replaces the normal cursor with a blinking bar-shaped cursor and replaces the OK prompt with HI.

Once loaded into memory, except for these modifications, it is invisible to the user. Any `LLIST` or `PRINT#-2` commands are automatically routed through the spooler's buffer. It takes a few seconds to load the print buffer (depending on the size of the file), then the HI prompt is given. A program like this makes you really appreciate the power of the microprocessor built into the Color Computer. This trick of multitasking between two functions with no apparent delays is phenomenal.

Being a software rather than hardware-based spooler has some disadvantages which offset, to an extent, the significant cost advantage. Each time you boot-up the computer, you must load the *Spooler* program, a minor inconvenience to some; a major stumbling block to others. Another disadvantage shared by software spoolers in general is an incompatibility with most word processors available for the Color Computer.

The more sophisticated word processors are designed to use the upper 32K, which is the spooler's buffer space on a 64K CoCo. In addition, these programs do not share the same printer code routing. This incompatibility is perhaps the biggest flaw with this method of spooling because many long printouts are associated with word processing files.

Other than the inherent shortcomings of this type of spooler, *Spooler* is an excellent program with many time-saving applications. It is easy to use and almost self-explanatory. There are instructions which are included with the program as a separate file on the tape to be printed out on your printer. You can decide for yourself if the program will fit your application.

To obtain a copy, send a stamped, self-addressed mailer with cassette or formatted disk to the address described at the end of this review.

Remember, if you find that the program is suitable and use it in your work, send a donation to the distributor. This alternative to conventional distribution will only work if supported by all the benefactors.

As a reference, programs similar to this one sell in the range of $10-$15.

(The CoCo Freeware Clearinghouse, P.O. Box 1084, Morgantown, WV 26507. For 64K Color Computer available on approval basis by sending cassette or formatted disk along with stamped mailer. Request program #351A [documentation] and 351B [spooler].)

— Tom Szlucha

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Disk Master — A Good Addition To Utilities Library

By Eldon Doucet

For those interested in this program, I would ask you first to read a previous review in the August '84 RAINBOW, Page 205, for the program *Swiss Army Knife* by Dataman International. The reason for this is *Disk Master* is the successor program to it.

Disk Master is actually a combination of two separate utility packages — *Disk Utility* and *SAK* (*Swiss Army Knife*) — written by two different authors. *SAK* is the same program I reviewed in the August 1984 RAINBOW, so I will not reiterate here. Dataman has decided to combine both programs for sale as one. *Disk Master* is a collection of BASIC programs (and *SAK*) written for a Disk system, minimum 16K and one disk drive. Each program on the disk performs specific functions as described in the manual. The programs are loaded and run from a menu program, and each program (except for *SAK*) will rerun the menu program when it is exited.

The functions they provide, in the order presented in the menu, are as follows: Copy Utility, Sort Directory, Modify Machine Language Program, Disk Space Map, Disk Look, Address Find, Set Parameters, Backup Directory, Recover Crashed Disk, Disk Directory and Execute *SAK*. A note here: The manual does not present the instructions for each utility in the same order as the menu program presents them. Instead, it does it alphabetically, and the manual's index only lists the actual program name of the utility, not what you see on the screen in the menu. I would have found it much easier to follow if the manual were laid out according to the menu presented on the screen.

Having the programs set up on the disk has its advantages and disadvantages. All of the programs are stand-alone and each utility can be loaded by itself and run. This is accomplished by the menu because the utility selected is loaded by the menu, which in turn reloads the menu when the utility is exited. Instructions are given in the manual on how to disable the rerunning of the menu if you wish to run a utility on its own. Having all the programs separate means the program disk has to be referred to all the time. With a one-drive system, this means a lot of disk swapping between performing the utilities and running new ones.

Describing the utilities: Copy copies any or all of the programs from one disk to another. You choose if you want to copy all of the programs on the disk or select which ones you want to copy. A one- or two-drive copy can be performed. When the select feature is on, a reply of 'Y' copies the program (any other key does not copy) and reads the next program on the directory. At this point a choice of quitting would have been nice, so the whole directory doesn't have to be read to finish the Copy utility.

Sort performs a filename sort of all good directory entries on the disk and sorts them alphabetically. Only a filename sort is done and a sort by extension or filetype would have been nice features to incorporate.

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Modify is a good feature of these utilities. It modifies an ML program to allow it to auto-execute when it is loaded, as some games for the CoCo already do. The modification is done directly on the disk and is not reversible. For those experts out there, it can be reversed manually using a *Zap*-type program like *SAK* to change the disk back. The actual program is not modified (only the address where it loads into memory), so the extra code added to the end of the program will be executed first, which will in turn `LOAD` and `EXEC` the original program.

Disk Space Map provides a picture of the file allocation table on the screen or printer showing which granules are empty, full or how many sectors of a granule are being used. No index numbers are used to help you find a specific granule number so if want to know if granule 43 is empty, you'll have to count the granules on the screen. One note here: The title for the screen display had its underline one character too short. Nothing that will affect the program, but a little lack of attention to detail.

Disk Look provides a dump of any sector or sectors on the disk in hexadecimal and ASCII format. The printed output will list one sector and then prompt if you wish to continue with the next sector, whereas the screen dump will continue on after each half-sector is displayed by pressing the space bar. Again, no index numbers are provided to indicate the reference location on the disk being printed or displayed.

Address Find is a good program that displays or prints the start, end and exec address of a machine language program. Multiple origins are also shown with a complete list being displayed or printed.

Set Parameters allows you to set the Baud rate of the RS-232 output to match to your printer. This should be done before you print anything. Another feature of this program is a 64K conversion routine, which works like any other by copying the ROMs into RAM and then leaving you in a 64K RAM mode. But this 64K conversion program adds a few things.

As mentioned in the manual, the reset routine of BASIC is modified so that pressing the Reset button will not cause a return to RAM/ROM configuration. What is not mentioned in the manual are some undocumented changes done by the 64K conversion program. The cursor is changed right in the BASIC code, the prompt for Disk Extended Color BASIC 1.0 is changed to Disk Extended Color BASIC X.0, and `PCLEAR 4` is not done on cold start.

Backup Directory allows the user to make a duplicate copy of the disk allocation table and the disk directory to several unused sectors on Track 17. This is a good idea to make a backup of the directory, but I don't like doing it to the same track. From experience, if one sector of the directory crashes, sometimes others do as well. You could lose your backup as well!

Recover Crashed Disk is the other half of the backup program which uses the information previously saved by Backup Directory and reconstructs the file allocation table and the directory. Make note that any changes made to the directory since it was last copied will be lost when the recover is done and may result in the loss of some of the programs on the disk.

Disk Directory displays or prints a detailed disk directory giving more information than a normal directory by providing the name, extension, file type and the file format as well as the granule chain of the program listed. The granule chain is a nice feature as it displays all the granules a program uses in the order it uses them. All the numbers are printed in decimal, but the program, being in BASIC, can be modified. The one item left out of the granule chain (I suspect on purpose) is the number of sectors used in the last sector by a program.

The manual comes in a nice half-size, three-ring binder with a pocket in the front for the disk. The disk is unprotected and two copies of each program are on it.

The program should be a good addition to your utility library, even if you only use one or two of the supplied utilities.

(Dataman International, 420 Ferguson Ave. N., Hamilton, Ontario, Canada L8L 4Y9, $33.95 U.S., $39.95 CND., plus $2.50 S/H)

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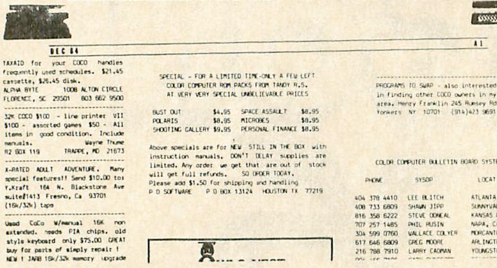

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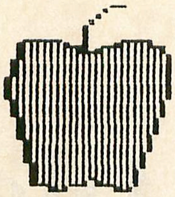

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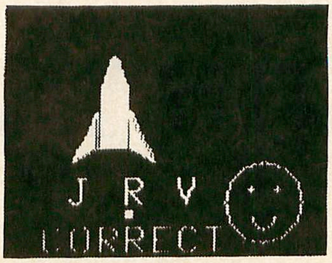

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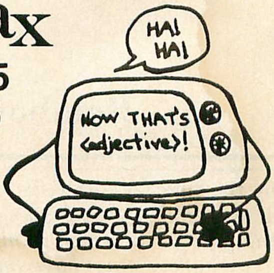
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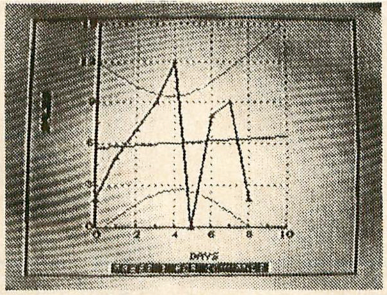

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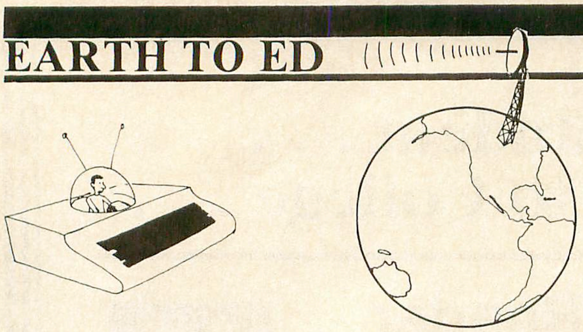

A Chip Off The Old CoCo

By Ed Ellers
Rainbow Technical Writer

Just after our March '85 issue went to press, I received some more information from Bob Rosen about upgrading those new Korean CoCos to 64K. You may remember from my March column that the so-called 'A' version (models 26-3134A and 3136A) used the new Texas Instruments TMS4416 16K-by-4-bit RAM chips, and I didn't know if 64K-by-4 RAMs would work for a 64K upgrade. Bob now tells me they do.

The chips to get are either NEC's uPD41254 (not 41256 — that is a 256K-by-1 chip like the ones used in some of the newer computers) or TI's TMS4464, which Bob tells me is not yet available. Two chips are used; as with earlier CoCo 2s, the upgrade merely involves prying out the old 16K chips, inserting the new ones and soldering a wire across the 64K jumper points.

One catch at present (I'm writing this at the beginning of February) is that two 64K-by-4 chips cost about three times as much as eight 64K-by-1 RAMs. The new chips actually contain 256K bits, and this new technology isn't as well developed as that involved in 64K-by-1 (or 16K-by-4) RAM manufacturing.

It's generally believed that 256K prices will drop to reasonable levels very soon; perhaps it will have happened by the time you read this. (They don't call dynamic RAM "volatile memory" for nothing!)

(Ed Ellers, a RAINBOW *and* PCM *staff member, is a self-confessed electronics fanatic whose other interests include science fiction.)*

Now for the letters . . .

CoCo Cooking Compatibility

• *I presently own a 64K CoCo with one drive and the J&M Systems Controller with JDOS. Please advise me if "Cooking With CoCo" will run with JDOS, or if there would be any damage to the hardware or operating system.*

Alan Siegler
Norfolk, VA

Colin Stearman's DOS patches are intended for Radio Shack Disk BASIC; JDOS is an entirely different program, so it would not work. The patched Radio Shack DOS will work fine on the J&M Controller, and I can assure you this sort of patching can't damage your equipment.

Chopped Graphics

• *When using Radio Shack's* BWDUMP *program on my DMP-110 printer, the left and right margins are cut off. Are there any corrective fixes or commands that can rectify this problem? If not, is there another screen dump for the DMP-110 which does not have this problem?*

Dick Teeter
Hawley, PA

I don't know of any fix for *BWDUMP*. Apparently, the reason the sides are truncated is that the screen is 256 dots wide, while printer bit-image modes can usually print 480 (or 960 or 1920) dots across an 8½-inch page; *BWDUMP* seems to double the 256 dots to 512 and then drop the excessive bits to fit in 480-dot columns. Other screen dump programs I've tried generally use a fairly small print size to get around this problem. Several of our advertisers have screen dump programs for Radio Shack printers.

Can't Print Graphics

• *My Panasonic KX-P1091 printer will not print graphics from programs I've gotten from* THE RAINBOW *and other sources. Is there a way to edit graphics programs for the Radio Shack Line Printer VII to make them compatible with the Panasonic? Are there screen dump programs available for this printer?*

Frank Nolan
Danvers, MA

A representative of Panasonic Industrial Company told me their 1090 series printers are compatible with programs written for various Epson models. The later versions of the KXC-P1090 are compatible with the MX-80F/T; the 1091 (which you have) is compatible with the RX-80 F/T; the 1092 is compatible with the FX-80; and the 1093 is compatible with the FX-100. Any Epson-compatible screen dump should work. I don't really have any advice for you about converting BASIC programs from one printer to another. If you don't have a working knowledge of bit-image graphics, you'll have a big job ahead of you.

A MIDI Problem

- *I have a CoCo and a Yamaha DX-7 synthesizer which is equipped with Yamaha's Musical Instrument Digital Interface (MIDI). Apparently, almost any computer should be suitable for use with the DX-7, provided it is fitted with a special hardware interface capable of communicating at 31,250 Baud and programmed to satisfy the MIDI specifications.*

My problem — and my appeal for help — is that I haven't been able to find either the software or the hardware to allow me to link up my CoCo and my DX-7. Do you, or any of your readers, have any solutions to my problem?

Gareth P. Jones
Scarborough, Ontario

I have to say I really don't have any ideas. The CoCo's serial I/O system can't operate reliably at speeds higher than 9600 Baud. Would anybody like to take a shot at this?

Love Affair Needs Patching

- *As much as I love* RAINBOW, *there is one thing I love even more — and that's* Telewriter-64. *I do everything from letters to mailing lists on it. But it lacks two functions I would give my right disk drive for: an auto-repeat for keys that are held down, and a way to make the format values default to the ones I use most often. Is there a patch or two that can be worked out for these functions?*

J.D. German
Cedar Crest, NM

Adding an auto-repeat feature to *Telewriter-64* would involve some rather involved assembly language programming, but the default settings (most of them) are easy to achieve. Major Richard D. Benton in Carson, Calif., sent in a hint recently about how to do it. He says that it works with all versions, but I've only tried it with the disk versions of *Telewriter-64*.

The eight variables that you can set up are printer Baud rate, line length, line spacing, left margin, upper and lower margin, lowercase and pause (to print on single sheets). In addition, you can also set the program to come up with a green screen (for those with color TV sets or monitors; buff is fine for black and white TVs or monochrome monitors). All these patches are made to the BASIC loader program.

Load the BASIC program without running it. Look for the line in the program that starts with `POKE 253,50`. In the disk version, this will be Line 326. If you want a different line length, change the 50 to the length you want. (This will not change character sizes, though; *Telewriter-64* will still come up in the 51-column screen mode.) If you want to set up the program for double-spaced printing, change the 1 in "`POKE 213,1`" to 2.

To make the other changes, add any or all of the following `POKE`s to the end of the same line:

`POKE 150, n`	Set printer Baud rate
`POKE 198, n`	Set upper margin
`POKE 243, n`	Set lower margin
`POKE 255, n`	Set left margin
`POKE 282, 0`	Set for lower case keyboard (caps lock disabled)
`POKE 1006, 1`	Set for single-sheet printing (pause after each page)

If you want to change over to a green screen for use with a color TV, you can insert a `POKE` in another line to make *Telewriter-64* do this automatically. The address to `POKE` varies depending on whether you have the cassette or disk version and whether or not you have 64K RAM in your computer. (If you have over 20K of text buffer space, you do.) In addition, there are two different `POKE` addresses for each configuration, because *Telewriter-64* was modified a while back to work with the newer versions of the CoCo. Here are the pairs of addresses to try:

16K or 32K cassette	12522 or 12525
64K cassette	61122 or 61125
16K or 32K disk	12729 or 12732
64K disk	61259 or 61262

The way to find out which of the two to use is to run *Telewriter-64*, select the BASIC option (from the main menu on cassette or the disk I/O menu on disk) and type `PRINT PEEK address`. Whichever of the two returns a value of 248 is the one you want. After resetting your system, find the line in the BASIC loader that starts with `LOADM''TW64''` (`CLOADM` for cassette), and insert `POKE address, 240` between the `LOADM` command and the next command on the line. Now save the loader program under a different name; "TW64" is fine.

I've found that the lowercase and green screen `POKE`s are most helpful to me; the line length `POKE` is less helpful, because I usually type at a line length of 50 and then change it before printing.

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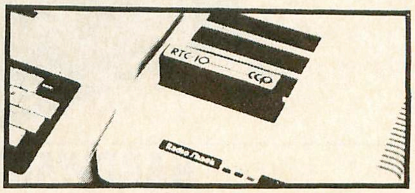

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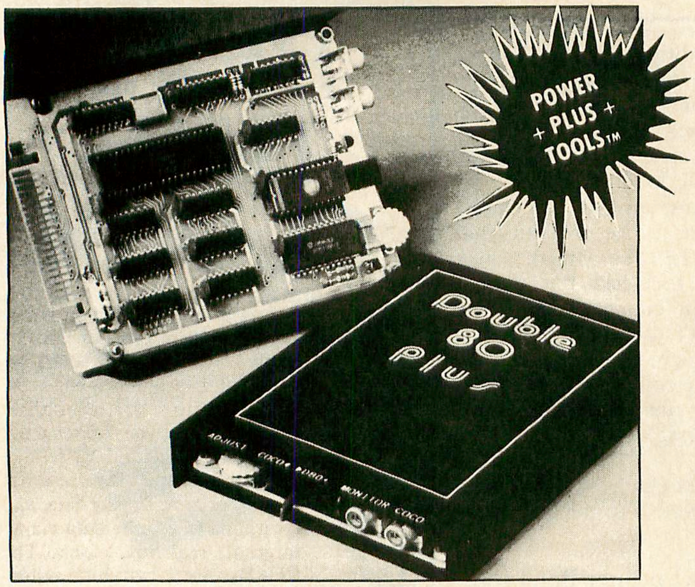

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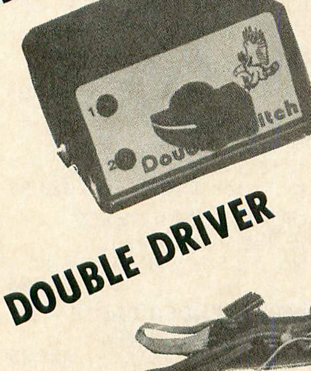

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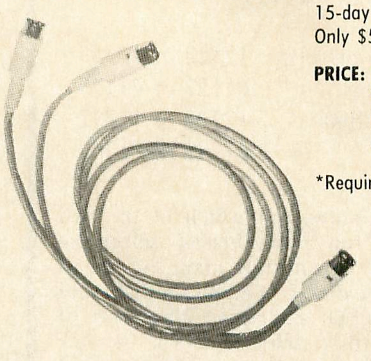

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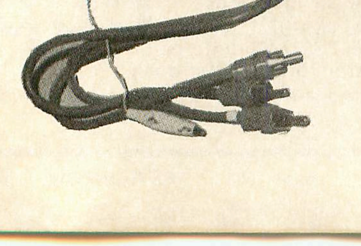

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- Several Printer Formats
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BAUD Rates:
- 110-4800 (communicate)
- 600-9600 (printer)

Screen Format:
- 32 x 16, 42, 51, 64 or 85 x 24
- Send all 128 characters from keyboard

Buffer:
- Merge text or programs
- 49K to 53K memory
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RATE 6,35... change the head stepping rate.
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Please let us know if we have omitted any clubs and send us complete up-to-date addresses. Only those clubs which have signed our "agreement form" will appear in this listing of CoCo Clubs. Also, please notify us if you wish to add or delete any names on this list. Send your information to:

CoCo Clubs
THE RAINBOW
9529 U.S. Highway 42
P.O. Box 385
Prospect, KY 40059

ALABAMA

Birmingham Alabama Color Computer Club, Robert Matthews, 3529 Laurel View Lane, Birmingham, 35216, (205) 933-0887

Huntsville Color-80 Users Group, Randy Niemann, 1011 Versailles Dr., S.E., Huntsville, 35803, (205) 882-2485

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Color America Users Group, Mark Randall, 2227 Canyon Rd., Arcadia, 91006, (213) 355-6111

The Davis CoCoNuts, Adam Sherman, 1818 Haussler Dr., Davis, 95616, (916) 758-3195

Sacramento Color Computer Club, Wayne Chrisope, P.O. Box 9, Elverta, 95626

North American CoCo - Orange County, Eric Wilson, 8405 Sweetwater Circle, Huntington Beach, 92646, BBS (714) 847-2268

Joe Bennett, 1169 Florida Street, Imperial Beach, 92023, (474-6213)

Los Angeles-Wilshire Color Computer Users' Group, Norm Wolfe, P.O. Box 11151, Beverly Hills, 90213

Ventura County Color Computer Club (VC4), c/o Pete Lydall, Oxnard Public Library, 214 "C" Street,Oxnard, 93030, (805) 984-1842 or DATA (805) 984-1842

Sacramento CoCo Club, Charles Doughty, Box 60511, Sacramento, 95860

Salinas Color Computer Club, Larry Livingston, 501 Monterey Highway, Salinas, 93908, (408) 484-9697

Citrus Color Computer Club, Joseph Kohn, P.O. Box 6991, San Bernadino, 92412, (714) 792-8721

The MC-10 Newsletter Club, Jose J. Bray, 4730 Cass Street, San Diego, 92109, (619) 483-8744

Local Color—A CoCo Club of San Francisco, Andrew G. Kieval, P.O. Box 421242, San Francisco, 94142

San Joaquin CoCo Club, Steven Paul Moreno, P.O. Box 99024, Stockton, 95209, (209) 951-3938

Silicon Valley Color Computer Club, Shawn Jipp, P.O. Box 61593, Sunnyvale, 94088, (408) 749-1947

CoCo Nutz Computer Club, Walter V. Seay, 68-461 Highway 86, Thermal, 92274, (619) 397-4252

South Bay Color Computer Club, Karen Schlotzhauer, 23113 Dana Ave., Torrance, 90501, (213) 539-2539

COLORADO

Lowry Microcomputer Club/CoCo Users' Group, Jerry D. Surritte, 2249 Moline St., Aurora, 80010, (303) 343-3273

Colorado Color Computer Club, Joe Applegate, P.O. Box 33492, Northglenn, 80233, (303) 650-9768

FLORIDA

Northwest Florida CoCo Nuts, William N. Lamb, P.O. Box 1032, Fort Walton Beach, 32549, (904) 244-5281

Alachua County CoCo Special Interest Group, Chris Meyers, P.O. Box 14927, Gainesville, 32604, (904) 378-9598

Jacksonville Color Computer Club, William H. Brown III, 2411 Hirsch Ave., Jacksonville, 32216, (904) 721-0282

CoCo Chips Color Computer Club, 6 Belle Mead Circle, Largo, 33540, (813) 581-7779

Broward County Color Computer Club, Timothy D. Neary, 510 S.W. 64th Ave., Margate, 33068, (305) 972-4074

C.C. Club of Sarasota, Ernie Bontrager, 4047 Bee Ridge Rd., Sarasota, 33582, (813)921-7510

Broward CoCo Club, Sue Spahn, 11950 N.W. 29th Manor, Sunrise, 33582, (305) 741-4737

IDAHO

CoCo-AG Farm Computer Users Group, Kelly Klass, Rt.1, Box 4133, Twin Falls, 83301, (208) 733-4251

ILLINOIS

Glenside Color Computer Club, Ed Hathaway, 8 W. Stevenson Drive, Glendale Heights, 60139, (312) 462-0694

Town & Country CoCo, 5461 S. Kenwood, Chicago, (312) 493-3748

Cook County Color Computer Club, Tim Powers, 1633 Fifth Ave., Chicago Heights, 60411, (312) 747-7062

Illinois Color Computer Club of Elgin, Steven Stroud, 1098 Florimond Dr., Elgin, 60120, (312) 695-3186

Northern Illinois Color Computer Club, 580 Milton Lane, Hoffman Estates, 60194, (312) 885-2573

Peoria Color Computer Club, Lawrence Parker, 418 Lakemper Dr., Metamora, 61548, (309) 383-4312

Motorola Microcomputer Club, Steve Adler, 1301 Algonquin Rd., Schaumburg, 60196, (312) 576-3044

INDIANA

Three Rivers Users Group, Russ Garner, 533 Villa Park Ct., Fort Wayne, 46808

Indy Color Computer Club, Mike Davis, P.O. Box 68702, Indianapolis, 46268, (317) 257-3300

Southern Indiana Computer Club, Route 1, Box 459, Mitchell, 47446

CoCo Program, Erik Merz, 310 Appletree Dr., Noblesville, 46060, (317) 842-1340

IOWA

Metro Area Color Computer Club, K.L. Knudtzon, 3324 11th Ave., Council Bluffs, 51501

Mid Iowa CoCo, Terry Simons, 1328 48th Street, Des Moines, 50311, (515) 279-2576

Iowa City TRS-80 Users Group, Susan Chapler, R.R. 6, The Woods, Iowa City, 52240, (319) 351-5959

KANSAS

Kansas City CoCo Club, Mike Allinder, P.O. Box 11192, Kansas City, 66111, (913) 287-1904

Topeka Color Computer Club, Kevin Cronister, 2224 Hope, Topeka, 66614, (913) 272-1353

Color Computer Club of Wichita, Rex Rivers, 1205 N. Mosley, Wichita, 67214, (316) 264-9193

Walnut Valley C.C. Users Club, David Anderson, 1212 E. 4th St., Winfield, 67156, (316) 221-0040

KENTUCKY

LOCO-COCO, Mike Standefer, 3141 Doreen Way, Louisville, 40220, (502) 458-6690

LOUISIANA

Red Stick Color Computer Club, Gary Cash, 8929 Metairie Drive, Baton Rouge, 70810, (504) 293-7799

Cajun CoCo Club, Bob Hoevel, 104 Karen St., New Iberia, 70560, (318) 365-7706

MASSACHUSETTS

Greater Boston Super Color Users Group, Robert Biamonte, 6 Boulder Drive, Burlington, 01803

New England C.C. Users Group, Christopher E. Sweet, R.D. 2, Box 261, Harvard, 01451, (617) 456- 8291

Massachusetts CoCo Club, Jason Rahaim, Spring St., Lunenberg, 01462, (617) 582-6514

6809'ers, Jean Salvas, 204 East Street, Springfield, 01104, (413) 734-5163

MICHIGAN

Petoskey Area CoCo Club (PAC^3), Dennis Hoshield, 670 Liegl Drive, Alanson, 49706, (616) 347-0607

Greg Miller, P.O. Box 365, Haslett

Midland C.C. Club, Neil Drake, 709 Coolidge, Midland, 48640, (517) 631-2939

Michiana CoCo Club, Clay Howe, 310 S. Jefferson St., Sturgis, 49091, (616) 651-4248

MISSISSIPPI

Singing River C.C. Club, Mark Welch, 3605 Vancleave Rd., # 118, Gautier, 39553

MISSOURI

North County 80 Group, Tom Vogel, 12 Ville Donna Ct., Hazelwood, 63042, (314) 739-4078

Mid-America Color Computer User's Group, Jerry Morgon, 807 Ponca Drive, Independence, 64056, (816) 796-5813

Coconuts, 1610 N. Marlan, Springfield, 65803

MONTANA

Billings C.C. Club, Jayne Kenyon, 4306 Phillip, Billings, 59101

NEBRASKA

TRS-80 Color Computer Users Group of Lincoln, Jonathan Skean, 2629 South 15th St., Lincoln, 68502, (402) 475-9815

NEW JERSEY

Intrasoft, Ravi Sakaria, 139 Candace Lane, Chatham Twp., 07928, (201) 635-8025

Bug 80 Users' Group, George R. Miller, Jr., Box 62, Glen Gardner, 08826

Loco CoCo Club, Bud Lavin, 73B Wavercrest Ave., Winfield Park, 07036

NEW MEXICO

Chaves County Color Computer Club, Lee Mitchell, 1102 Melrose Drive, Roswell, 88201, (505) 623-0789

NEW YORK

Adirondack CoCo Club (Albany Chapter), Ron Fish, Box 4214, Albany, 12204

Queensboro Color Computer Club, Bob Rosen, Springfield Blvd. & 56th Ave., Bayside, 11364, (212) 631-6233

Local CoCo, Charles Martin, P.O. Box 901, Bellmore, 11710

Broome CoCo Club, Bucky Helmer, 57 Front St., Binghampton, 13905

Adirondack CoCo Club, (Home office), Bill Edwards, Box 365, Bolton Landing, 12814, (518) 644-9927

Kings Byte CoCo Club, Morty Libowitz, 1063 East 84th St., Brooklyn, 11236, (212) 763-4233

Adirondack CoCo Club (Glens Falls Chapter), Dave and Richard Mitchell, 39 Center St., Fort Edwards, 12828

C.C. Club of Central N.Y., Joseph Short, 248 S. Fourth Ave., Ilion, 11357, (315) 895-7730

Olean Area CoCo Users Group, Herman L. Smith, P.O. Box 216, Olean, 14760, (716) 372-1170 or 372-3121

NORTH CAROLINA

TRS-80 Users' Group of Charlotte, Jason Foodman, 240 Medearis Dr., Charlotte, 28211

Raleigh Color Computer Club, David Roper, P.O. Box 681, Garner, 27529

OHIO

CoCo Club of Youngstown, Timothy McFadden, P.O. Box 478, Canfield, 44406, (216) 788-4218

Columbus & Central Ohio Color Computer Club, D.E. Sparrow, 19 E.N. Broadway, Columbus, 43214, (614) 268-5366

Dayton CoCo Users' Group, Joseph P.Evans, 609 Applehill Dr.,W. Carrollton, 45449

Cincinnati TRS-80 Users Group, R.A. White, 44 Dow Court, Fairfield, 45014

Dayton Are Color Computer Users Group, David R. Barr, 2278 Yorkshire Pl., Kettering, 45419, (513) 293-2228

M.U.G. of CoCo—Middletown Users Group, James Carr, Middletown, 45042, (513) 424-6905

Northeastern Ohio (N.E.O.) CoCo Club, Tony Rugue, 527 Malvern Drive., Painsville, 44077, (216) 354-2736

Miami Valley CoCo Club, R. Douglas Wales, 2065 LeFeure Rd., Troy, 45373

OREGON

Willamette Valley CoCo Users, Brian James, P.O. Box 11468, Eugene, 97440, (503) 687-9286

PENNSYLVANIA

HUG-A-CoCo, George Lurie, 2012 Mill Plain Court, Harrisburg, 17110, (717) 657-2789

Penn-Jersey Color Computer Club, P.O. Box 2742, Lehigh Valley, 18001

Capital Area TRS-80 Users Group, Sally Bishop, 340 Lewisberry Rd., New Cumberland, 17070, BBS (717) 732-3275

Pittsburgh Color Group, William Tucker, P.O. Box 351, West Mifflin, 15122, (412) 466-3078

RHODE ISLAND

New England CoCo Nuts, P.O. Box 6604, Providence, 02940

SOUTH CAROLINA

Invitation Software Group, Tom Reed, 3562 Linbrook Dr., Columbia, 29204, (803) 786-0541

Midlands 80 Computer Club, Tommy Sanders, P.O. Box 7594, Columbia, 29202, BBS (803) 755-3414

Metropolitan Greenville CoCo Club, Ed Lowe, P.O. Box 6, Gray Court, 29645, (803) 876-3928

Hilton Head Island CoCo Club, Kevin Clark, P.O. Box 6187, Hilton Head Island, 29928, (803) 785-9630

Spartanburg County CoCo Club, Dennis Shattuck, 473 Royal Oak Drive, Spartanburg, 29302, (803) 583-3017

TENNESSEE

Chattanooga CoCo Club, Jim Perkins/Jim Cox, P.O. Box 9825, Chattanooga, 37412, (615) 870-2439

Memphis Color Computer Users Group, Ben Barton, 4903 Warrington Rd., Memphis, 38118, (901) 795-7075 or 362-5945

TEXAS

CoCo User Group, David Karam, 1809 Dexter, Austin, 78704, (512) 442-6317

B/CS Color Computer Users Group, Dale Cuthbertson, 1812 Michael Lane, Bryan, 77801, (409) 822-0731

Deer Park Color Computer Club, Donald Burr, 4314 W. Grant, Deer Park, 77536, (713) 479-5313

International Color Computer Club, Inc., Robert L. Garrett, 2101 East Main Street, Henderson, 75652, (214) 657-7834

UTAH

Ogden CoCo, Kathy Rush, 4535 S. 2600 W. Roy, Ogden, 84067

VIRGINIA

D.C./N. VA. C.C. Club, Jack Darling, 43 Donovan Dr., Alexandria, 22306, (703) 780-6159

Northern Virginia C.C. Club, Logan McMinn, 6048 Belleview Dr., Apt. 1, Falls Church, 22041

Central Virginia Color Computer Club, Lane Lester, 413 Woodland Circle, Lynchburg, 24502, (804) 237-4188

WASHINGTON

Northwest Computer Club, Judy Gehman, E. 14012 Cataldo, Spokane, 99216, (509) 928-2169

WEST VIRGINIA

Kanawha Valley Personal Computer Club, P.O. Box 5354, Charleston, 25311, BBS (304) 925-3338 or 345-6502

Mtn. State CoCo Users Group, Donald G. Barber, Jr., P.O. Box 1084, Morgantown, 26507, (304) 599-4493

Mil-O-Bar Computer Club, Jim LeMaster, P.O. Box 130, Ona, 25545, (304) 743-4752 after 4 p.m.

Blennerhassett CoCo Club, David Greathouse, Rt. 9, Box 119, Parkersburg, 26101

West Virginia Color Computer Club, William Mucklow, 949 Baier Street, St. Albans, 25177, (304) 727-6764

WISCONSIN

CoCo-MUG, Tom Fandre, P.O. Box 10152, Milwaukee, 53210, (414) 542-0600

Southern Wisconsin CoCo Club, David C. Buehn, P.O. Box 411, Twin Lakes, 53181

CANADA

ALBERTA

Calgary Color Computer Club, Don Towson, 832 Cannell Rd. S.W., Calgary, T2W 1T4, (403) 281-2855

Medley Computer and Electronics Club, P.O. Box 1267, Medley, T4A 2M0

NEW BRUNSWICK

Color Computer Moncton Users Group (CoCoMUG), Leo Allain, 91 Woodland Dr., Moncton, E1E 3C4, (506) 382-2190

BRITISH COLUMBIA

North Island CoCo Club, Ann Marie MacKay, P.O. Box 1740, Port Hardy, B.C., V0N 2P0

NEWFOUNDLAND

Avalon CoCo Club, A.R. Thompson, 10 Foran St., St. John's, A1E 4G1

NOVA SCOTIA

Halifax Dartmouth CoCo Users Group, P.O. Box 572, Dartmough, B2Y 3Y9, (902) 469-3656

ONTARIO

International Adventurer's Club, Maurice Dow, 84 Camberley Cres., Brampton, L6V 3L4

K-W C.C. Club, Peter Karwowski, 23 Hudson Crescent, Kitchener, N2B 2V7

London CoCo Nuts Computer Club, Harry K. Boyce, 180 Concord Road, London, N6G 3H8, (519) 472-7706

Meadowvale Color Computer Club, Howard Porter, P.O. Box 186, Streetsville, Mississauga, L5M 2B8

Niagara Regional CoCo Club, Harry VanDyke, 7707 Jubilee Drive, Niagra Falls, L2G 7J3

QUEBEC

Club D'Ordinateur Couleur Du Quebec, Inc., Jean-Marie Beaujean, P.O. Box 452, Succ. P.A.T., Montreal, J6A 3K2, (514) 270-7507

South Shore CoCo Club, Jacques Bedard, 33 Lisilre, St-Constant, P.Q., J0L 1X0

SASKATCHEWAN

Regina Color Computer Club, Georges Glass, 26 Tweedsmuir Bay, Regina, S4X 2B1, (306) 949-3942

Saskatoon Color Computer Club, Guy Tomashewski, 415-423 Pendygrasse Rd., Saskatoon, S7M 4Z2

AUSTRALIA

Blacktown City TRS-80 Colour Computer Users Group, Keith Gallagher, P.O. Box 264, Riverstone, New South Wales, 2765

CoCo Colyteens of Colyton, Dwayne Manson, P.O. Box 506, St. Marys, New South Wales, 2760

MEXICO

Mexico City Color Computer Club, Marcelo Luft, Laja #232, 01900 Mexico D.F., Mexico City, 5-68-78-75

WEST GERMANY

First CoCo Club Hamburg, Theis Klauberg, 2000 Hamburg 62, Bultenmoor 43

new clubs

Editor:

This is to announce the MC-10 Newsletter Club. The newsletter has feature articles, an online section, a feedback section and occasionally, a program. To join, send a check for $4 to Jose J. Bray, 4730 Cass Street, 92109.

Jose Bray
San Diego, CA

Editor:

We would like to inform your readers that the Conejo Color Computer Users Group has been formed which serves the southeastern Ventura County area. Our meetings are held in the Mercury Room of Mercury Savings, 2729 Agoura Road, Westlake Village, at 1 p.m. on the first Saturday of each month.

For more information, write the club at 1316 Calle Castano, 91360.

Lee Price
Thousand Oaks, CA

Editor:

RAINBOW magazine recently published my letter to the editor regarding my interest in hearing from other farmers using the CoCo in their farming operation. I have received several responses to my letter and wish to thank you for your help. The responses I have received have encouraged me to continue the plan of starting a users group for CoCo farmers. I truly believe this little CoCo gem could be as powerful in the farming business as a mega-buck IBM, at only a fraction of the cost.

For more information write to Rt. 1, Box 4133, 83301; or call (208) 733-4251.

Kelly Klaas
Twin Falls, ID

Editor:

The Christian County TRS-80 Users Group (CCTUG) would like to inform the readers of RAINBOW of our group. We have quite a few CoCo users and have been in existence for about two years. We are going to be at our third RAINBOWfest in Chicago, May 17-19. We are looking forward to corresponding or hearing from anyone interested in the CoCo.

Good work, RAINBOW, and we'll see you in Chicago! For information write to 1421 West England Street, 62568 or call (217) 824-4290.

Randy L. Smith
Taylorville, IL

Editor:

Our OS-9 Users Group meets every fourth Thursday of the month at 7 p.m., Wooddale Public Library. We publish a newsletter. For information write to 480 Gilbert Drive, 60191.

John Chasheen
Wooddale, IL

Editor:

The Dubuque Area Tandy Users Group meets the last Thursday evening of the month. All models of Tandy-Radio Shack computers are covered. Membership includes those just new to computers and those who date from Model 1 days. Interests vary from users, program writers, hardware hackers, etc. There is something for everyone.

A recent meeting included a demonstration of the Model 100 and how it was used in reporting and feature writing.

For more information in Iowa, write to Wes Kullhem, 1995 Lombard, Dubuque, IA 52001, (319) 556-4137.

In Illinois, write to Robert Mills, Box 464, Hanover, IL 61041, (815) 591-3377.

In Wisconsin, write to Daniel W. Mitchel, RR2, Box 145, Lancaster, WI 53813, (608) 723-4582.

We appreciate THE RAINBOW and your efforts. We congratulate you on the growth of your fine magazine and the high quality of the contents.

Robert Mills
Hanover, IL

Editor:

The Mid Iowa CoCo Club meets the second Monday evening of each month at 7 p.m. At each meeting we try to cover and discuss at least three areas of interest. BASIC programming, OS-9, reviews, monitors, disks, business or that latest game, etc.

M.I.C. offers you a chance to meet others with similar computing interests. We have people who have developed their interest in machine language, programming, games, word processing, business software, OS-9, etc.

The experts are welcome, but it's people that make this group of contributors fun. That's why we need you. Please contact me for the exact time and place of the next meeting. Free CoCo BBS (515) 277-6510. Write to 1328 48th Street, 50311.

Terry Simons
Des Moines, IA

Editor:

I would like to announce the existence of a small but growing CoCo club in the southeastern Louisiana area. While we cannot boast a BBS or a newsletter, we charge no membership dues. Our members exchange hints, helpful advice and encourage others of the value of the CoCo.

We welcome new members who live anywhere near Kentwood. Anyone desiring more information can write to me at Kentwood Color Computer Users Club, 607 Avenue K, 70444.

Paschal Wilson
Kentwood, LA

Editor:

We would like to announce the start of the Foxboro Color Computer Club. We meet the first Wednesday of the month at the Foxboro Library between 7-9 p.m. All are welcome to attend.

Foxboro, MA

Editor:

I would like to re-announce the development of the Massachusetts 6809'ers CoCo Club. We now have a monthly newsletter and a 24-hour Colorama BBS (413) 532-5631. We meet monthly at a local electric company and are looking for new members to join us. Please contact me at 204 East Street, 01104.

Jean Salvas
Springfield, MA

Editor:

We would like to announce the formation of the Odenton Color Computer Club in the Odenton-Fort Meade area. The club meets on the second Wednesday of each month at the Moss Building, Route 175 in Odenton. For more information call me at (301) 672-2905 after 5 p.m., or write me at 1616-B Forrest Avenue, 20755.

J.E. McCranie
Ft. Meade, MD

Editor:

I would like to inform the readers about the International Pen Pal Club. Our address is 8405 Sweetwater Circle, Huntington Beach, CA 92646. The club features its own BBS and large software library. New members are invited and can write for more information. Please enclose 25 cents for postage.

Eric Wilson
Peterborough, NH

Editor:

It is with great pride that I inform THE RAINBOW and the northern New Jersey area of a great CoCo club, The Meadowlands Color Computer Club. We have been in existence for over a year. We have something for everyone, every age, interest, etc. We support every 68XX based system. Our meetings are presently being held at the Belleville Recreation Center, 407 Jouralemon Street.

For more information call Bill Coram at (201) 751-8953, Jason Goldblatt at 779-6142, or Dave McGuire at 338-6460.

Bill Coram
Belleville, NY

Editor:

The Olean Area CoCo Users Group is accepting new members. Anyone interested in the CoCo is invited to attend meetings at Eastview Elementary School, Spring Street, any Tuesday evening at 7 p.m. in Room 202. For more information call (716) 372-1170 or write to me at P.O. Box 216, 14760.

Herm Smith
Olean, NY

Editor:

Please announce these new chapters of the Adirondack CoCo Club:

Adirondack CoCo Club (Albany Chapter), Ron Fish, Jr., Box 4214, Albany, 12204.

Adirondack CoCo Club (Glens Falls Chapter), Dave and Richard Mitchell, 39 Center Street, Fort Edward, 12828.

Anyone wishing to exchange public domain software, please write, as we are trying to start a non-copyrighted software exchange. Any companies wishing to send catalogs are welcome to do so.

Bill Edwards
Bolton Landing, NY

Editor:

I would like to form a CoCo club in my area. The club would be open to Oklahoma City and Mid-Del areas. If you are interested write me at Box 15084, 73155.

I would also like to have contact with CoCo users and clubs from across the country.

Stan Hall
Del City, OK

Editor:

I am the leader of the Color Computer special interest group of the Jefferson State Computer Users Group. We are starting a CoCo users group in Grants Pass. For information write me at 2847 LaMiracle, 97504, or call (503) 779-4618.

Andy Dater
Medford, OR

Editor:

I would like to inform everyone in the

Conway area of a new users group forming. Our name is CoCo Way. For more information contact me at Rt. 7, Box 469, Lot 39, 29526 or call (803) 365-6368. Also looking for modem users in our area. Thanks for a great magazine.!

Bud Moore
Conway, SC

Editor:

This is to announce the start of the Sioux Falls Color Computer Group. Our first meeting was held in October 1984 and meets bimonthly. We are a growing group looking for new members. Any and all inquiries are welcomed. For more information call (605) 334-6640 or write Rt. 6, Box 35, 57103.

Bill Mattingly
Sioux Falls, SD

Editor:

We would like to announce that the new Color Works Computer Club is now meeting. Anyone interested in joining contact Robert Ogle at (615) 524-8826.

We would also like to announce the K-80 Color Board is now online 24 hours a day, seven days a week. It has all the standard features plus some extras. Call (615) 688-8349.

Mike Phillips
Knoxville, TN

Editor:

I would like to inform all MC-10 users I am trying to start a users group. I hope to put out a monthly newsletter with members being the largest contributors. The MC-10 Users Group will communicate by mail and starting in April, I will also communicate via a modem. Anyone who wishes more information can write to me at 29 Morgan Street, 05401 or call (802) 863-6219.

Mark Kane
Burlington, VT

Editor:

I would appreciate your mentioning to your devoted readers my interest in forming or joining a national MC-10 club. Write to me at East 2924 Liberty, 99207.

Larry E. Haines
Spokane, WA

Editor:

This letter is to let everyone know that the Northwest CoCo Pen Pal Club and Library is now in existence.

Our club will operate as a nonprofit group to promote the growth of the Color Computer. Anyone may join; just send a stamped, self-addressed envelope to 829 East 52, 98404.

John Amato
Tacoma, WA

Editor:

We are pleased to announce the formation of Midwest CoCo Nuts, a Color Computer users group. We are a new group which has a lot of new possibilities. For more information and details write to RR 1, T.U. Lane, 53821 or call (608) 326-8794.

Todd Knapp
Prairie Du Chien, WI

Editor:

Our club is called CoCo Crazy. It is a nonprofit club and we have a monthly newsletter. Anyone from any country can join. Contact P.O. Box 59, T0M 0A0.

Woody Forner
Acme, Alberta

Editor:

The Calgary Color Computer Club meets on the first Wednesday of the month at 7:30 p.m. at Queen Elizabeth High School, 512 18th Street N.W. Our primary purpose is the promotion of the use and understanding of microcomputers and to assist each other in the use of the 6809 in particular. For more information write 832 Cannell Road S.W., T2W 1T4 or call (403) 281-2855.

Don Towson
Calgary, Alberta

Editor:

The Salmon Arm CoCo Club welcomes anyone interested in learning how to use the Color Computer and how to program. Write to me at RR 4, V0E 2T0.

David Coldwell
Salmon Arm, British Columbia

Editor:

This is to announce to your readers the formation of a VIP Software Users Group. If you use any VIP Technologies (Softlaw Corp.) products (*VIP Writer, Speller, Database, Terminal, Calc* or *Zap*) on a regular basis, let's hear from you. At the outset, we will be producing a newsletter containing tips and hints about how to use these programs more efficiently or in unusual and ingenious ways, but if there is sufficient response, perhaps a dedicated BBS will follow.

If this is of interest, send your name and address, let us know which programs you use and what benefits you'd like out of a users group. Also, please include one dollar to cover the cost of reproducing and mailing the first issue of the newsletter. In addition, input for the newsletter would be welcome. Write to me at 2885 West 30th Avenue, V6L 1Z1.

Robert Silverman
Vancouver, British Columbia

Editor:

We are a dedicated group of CoCo owners from the Blacktown area of Sydney, New South Wales in Australia. I believe we are one of the biggest groups (of which there are many) in Australia solely dedicated to CoCo.

We would welcome any correspondence from CoCo nuts wherever they may be. Our address is Blacktown City TRS-80 Colour Computer Users Group, P.O. Box 264, Riverstone, N.S.W. 2765 Australia.

Keith Gallagher
Sidney, N.S.W., Australia

Editor:

We are interested in starting a CoCo club in Chihuahua, Chih., Mexico. For information write to Trasvina Y Retes 5511, 31200.

Eduardo E. Benitez Read
Chihuahua, Chih., Mexico

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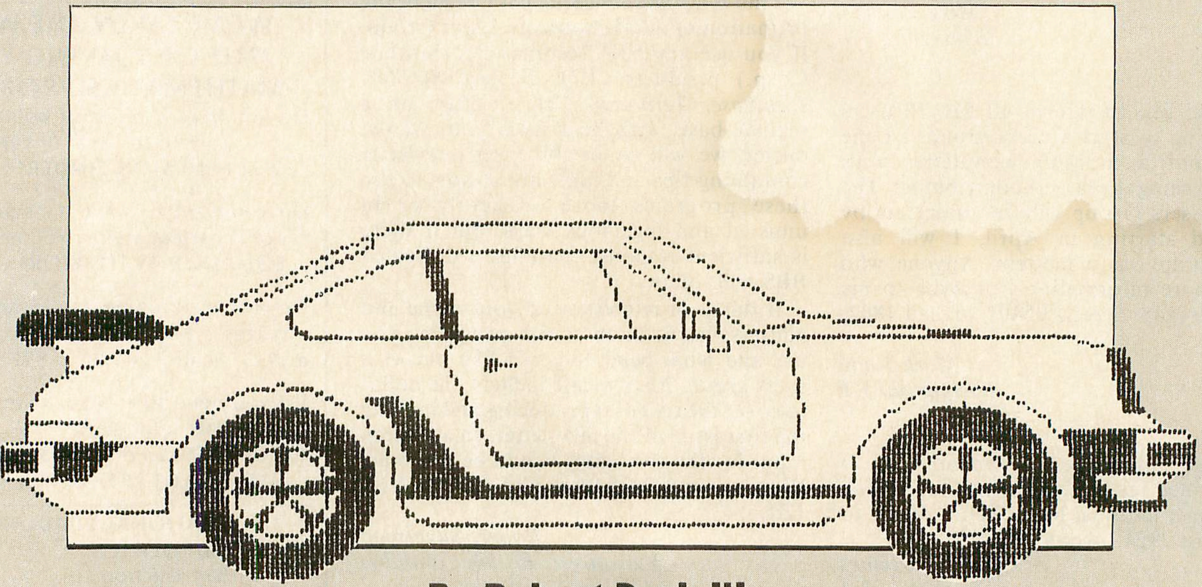

By Robert Davis III

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The listing:

17 99
46 114
59 152
END 198

```
1 '****************************'
2 '*    PORSCHE 930 TURBO     *'
3 '*     BY ROBERT DAVIS      *'
4 '*        MAY 1984          *'
5 '****************************'
6 PMODE4,1:PCLS5:SCREEN1,1
7 COLOR0,5
8 LINE(0,0)-(256,192),PSET,B
9 '** DECK LID **'
10 LINE(23,90)-(45,81),PSET
11 '** LETTERING "PORSCHE" **'
12 DRAW"BM60,164;U8R6D4L6;BM68,1
64;U8R6D8L6;BM76,164;U8R6D4L6R5D
2R1D2;BM84,164;R6U5L6U3R6;BM98,1
64;L6U8R6;BM100,164;U8D4R6U4D8;B
M114,164;L6U5R5L5U3R6"
13 '** LETTERING "930" **'
14 DRAW"BM140,164;U8L6D5R6;BM142
,164;R6U5L4R4U3L6;BM156,164;L6U8
R6D8"
15 '** LETTERING "TURBO" **'
16 DRAW"BM177,164;U8L3R6;BM182,1
56;D8R6U8;BM190,164;U8R6D4L6R5D2
R1D2;BM198,164;U8R5D3L5R6D5L6;BM
206,164;U8R6D8L6"
17 '** TIRES & WHEELWELLS **'
18 CIRCLE(67,115),19
19 CIRCLE(204,115),19
20 CIRCLE(67,115),12
21 CIRCLE(204,115),12
22 CIRCLE(67,115),10
23 CIRCLE(204,115),10
24 CIRCLE(67,115),2
25 CIRCLE(204,115),2
26 CIRCLE(67,115),23,,1,.5,0
27 CIRCLE(204,115),23,,1,.5,0
28 '** STRIPE AT BOTTOM **'
29 LINE(90,114)-(180,116),PSET,B
F
30 '** FRONT LIGHT **'
31 DRAW"BM240,98;M236,85;L3;M236
,98;R3"
32 '** HOOD & WINDSHIELD **'
33 DRAW"BM173,78;M139,59;G3M161,
81;R3E1R3E1R2E1;BM233,85;H1L2H1L
2H1M170,82;BM173,78;M210,82"
34 '** ARCS UNDER STRIPE **'
35 CIRCLE(96,116),6,,1,.25,.5
36 CIRCLE(176,116),6,,1,0,.25
37 '** AIR INTAKE **'
38 CIRCLE(67,115),27,,1,.87,0
39 DRAW"BM84,95;R6F1R2D1F3D1F2D1
F3D1F4R1F3"
40 '** REAR WINDOW **'
41 DRAW"BM46,80;M85,60;D3;M56,77
H1L1"
42 '** BOTTOM OF BODY **'
43 LINE(96,122)-(176,122),PSET
44 '** WHALE TAIL **'
45 DRAW"BM24,90;U4H3L5H2U3E2R20;
M45,80;G2L21"
46 '** REAR BUMPER & LIGHT **'
47 DRAW"BM48,104;L32U4R12F4R4G8L
14L2H1U1R7U4L7D4U5E1R10D8L6D1F2R
1F2R1F2R20U3"
48 '*ARC BETWEEN LIGHT & TAIL*'
49 DRAW"BM16,100;U2E1U1E1U1E3R1"
50 '** FRONT BUMPER **'
51 DRAW"BM224,102;R24L4H3F3R4F2D
1L9D4R9U4D4G2L10U9D9L11R19G3D2F1
D1G1L12U1L2U1L2U1L1U5R3F6R7"
52 '** ROOF **'
53 DRAW"BM85,60;R2E1R3E1R43F1R1F
1"
54 '** SIDE WINDOW **'
55 DRAW"BM155,81;U4L5D5U5L2D5R5D
3R4U2H2;BM150,77;M136,66;H1L1H1L
39G1L2G1L1M69,76;BM72,82;R74L8M1
30,64;BM100,82;M95,64R3M103,82"
56 CIRCLE(72,78),4,,1,.25,.70
57 '** DOOR **'
58 DRAW"BM103,82;G3D2M109,107;R1
D1R1D1R56E1R1E1U3E1U4E1U2H1U4H1U
3H1U1H1L1H1L7;BM108,88;R6L6U1R2D
2L2"
59 '** SPOKES (BACK WHEEL) **'
60 DRAW"BM67,115;M66,106;R1M67,1
15;M68,106;M67,115;M58,115;U1M67
,115;M59,113;U1M67,115;M77,115;U
1M67,115;M77,113;U1M67,115;M61,1
21;F1M67,115;M63,123;M67,115;M73
,123;E1M67,115;M75,121;M67,115"
61 '** SPOKES (RIGHT WHEEL) **'
62 DRAW"BM204,115;M203,106;R1M20
4,115;M205,106;M204,115;M196,115
;U1M204,115;M196,113;M204,115;M2
14,115;U1M204,115;M213,113;M204,
115;M198,121;F1M204,115;M200,123
;M204,115;M210,123;E1M204,115;M2
11,120;M204,115"
63 PAINT(60,100),0
64 PAINT(204,100),0
65 PAINT(24,80),0
66 PAINT(28,108),0
67 PAINT(16,108),0
68 PAINT(248,108),0
69 PAINT(232,108),0
70 PAINT(228,114),0
71 PAINT(95,104),0
72 PAINT(101,80),0
73 PAINT(237,92),0
74 PMODE3,1
75 GOTO75
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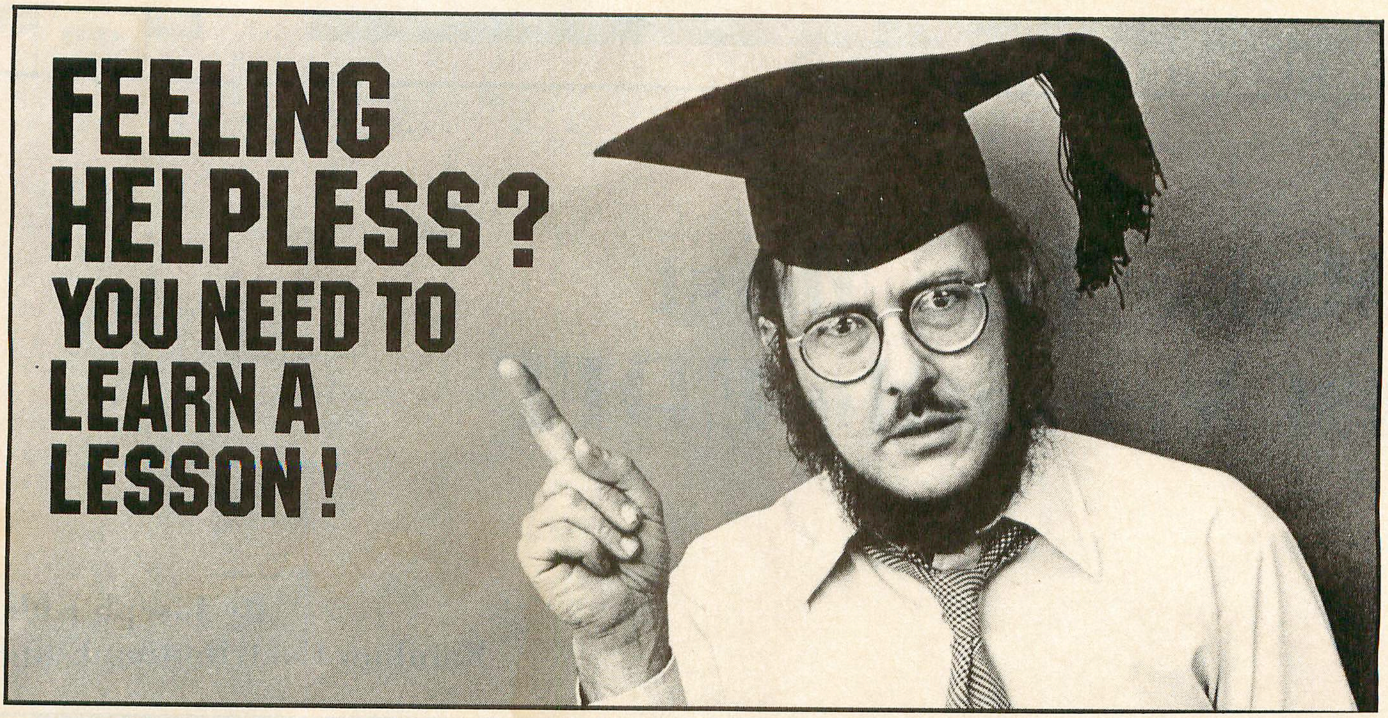
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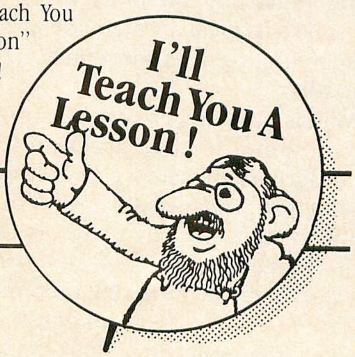
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TAKING BASIC TRAINING

16K
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Make The Most Of Versatile EDIT

By Joseph Kolar
Rainbow Contributing Editor

Aside from acutally creating a program, the most important feature of CoCo is the EDIT statement that is so vital to debugging a program. It is a feature that often confuses newcomers. At times, instead of making desired changes, imprudent use of EDIT causes new problems to pop up.

EDIT is a versatile tool that CoCo offers as a good friend to beginning programmers. At this point, you might refer to your manual for an overview of the subject at hand: EDIT. We will offer hints and methods of attack on editing a typical homemade program. Key in Listing 1, as presented, mistakes included.

When you are creating a program, try to compose your program lines in an orderly sequence. Reserve Line 0 for a REM program name line. You may want to start your program at Line 10 and proceed in steps of 10. You may want to begin at Line 100, incrementing each line "+10," reserving lines 1-99 for a title or instructions. This way, your listing will be linear. The listing will show in ascending lines the resultant program as it evolves on the screen.

In other words, a title may be shown first on the screen, followed by instructions or text and then a graphic. In the listing the title will be composed first using low numbers, then the instructions will be composed with larger line numbers. The graphic, being created last, will have the highest numbers (see Listing 1). As each line of text is created, it is assigned the next highest line number.

This is important! Look at the first display panel of Listing 1. "Proceed" is spelled incorrectly. To correct this glaring error, we must find the proper line. Since it is a straightforward program, where the line numbers become greater as you proceed through the displayed program, you can assume it is a low number near the beginning of the listing.

LIST-60 and ENTER. Conduct a search for the line to be edited. LIST-60 tells CoCo to list all the program lines from zero through 60. A quick search will pick up Line 40, which contains the error.

EDIT40 and ENTER, or if you prefer to give it your undivided attention, CLEAR EDIT40 and ENTER to get you into the edit mode.

Our object is to change the "DE" in "PROCEDE" to "ED." You could bang away at the space bar until the cursor is positioned over the offending 'D.' That is a lot of work!

You could take a guess as to the number of characters and spaces in front of it, say, 70. While in the edit mode, press '7' '0' and the space bar. CoCo will advance the cursor on top of the 'O' in "HOW." You have just made an educated guess. You are close! Space until the cursor is over the 'D.' Now, press '2' because we want to tell CoCo how many characters to change, beginning with the one the cursor is covering. Press 'C' and CoCo will be ready to change them. Key in ED. With that done and no other corrections to be made, press ENTER to exit the edit mode.

You can imagine that in a very long line of text, zeroing in on the error is a matter of guessing the target location. Remember, to make any changes, you must be in the edit mode. After completing each change, you must get out of the edit mode by pressing ENTER, then check your work.

If an error is near the beginning of a program line, it is quicker to get on target by advancing with the space bar.

If the error is near the end of a program line, it is simpler to press 'X' and the cursor will jump to the first free space after the end of the line. Use the left-arrow key and backspace until you are over the target; make the correction. Refer to the reference line and retype the balance of the line.

If the target is in a very short program line, it is quicker to re-key the line correctly.

Suppose you want to substitute the word "PRODUCTIVE" for "EFFICIENT" in Line 40. Hit CLEAR then type EDIT40 and enter. The quickest way, since it is near the end of the line, is to press 'X' to get to the end. Use

---

(Joseph Kolar is a free-lance writer and programmer dedicated to proselytizing for computers in general, and the CoCo specifically.)

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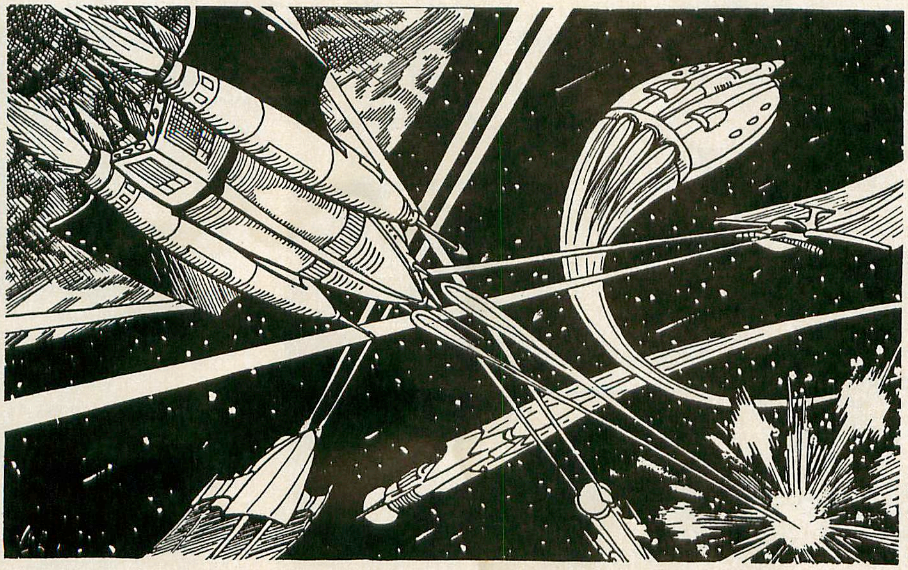

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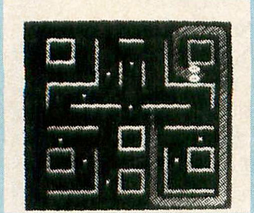

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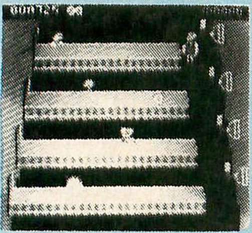

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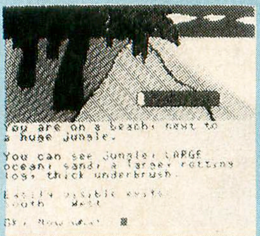

ou are on a beach, next to
a huge jungle.

You can see jungle, LARGE
ocean, sand, a large, rotting
log, thick underbrush.

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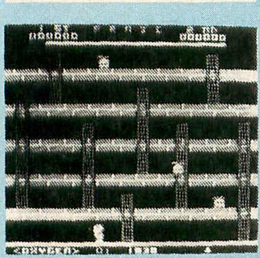

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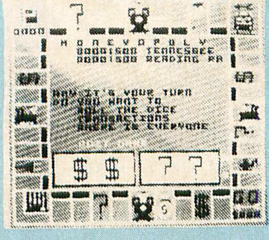

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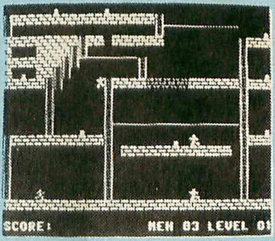

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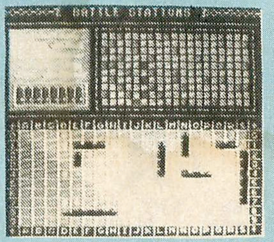

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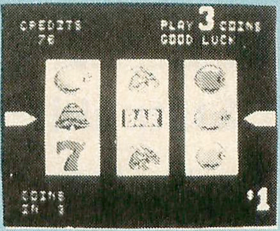

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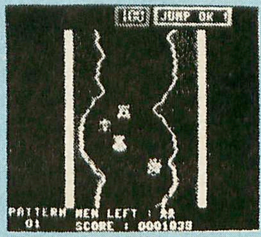

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the left-arrow key until the cursor is over the first 'E' of EFFICIENT, type PRODUCTIVE MANNER and press ENTER to exit the edit mode.

Look at the second line of the first panel. There's no period, so CLEAR EDIT30 and enter it as the very end. Press 'X,' the period and ENTER. If you forgot to get out of the edit mode and keyed in RUN and ENTERed, you got out of edit OK, but not until you added an unwanted RUN that will show up on the screen.

If the error is somewhere in the middle of a long program line, it is better to take an educated guess concerning the target location.

How do you take an educated guess? If you read the second line of the first panel, you will note that grammatically, it's wrong. "FEATURE" should be plural and "IS" should be "ARE." So, CLEAR EDIT30 and ENTER. Assuming that each line has about 30 characters/spaces, "FEATURE" is near the beginning of the third line. The second line has about 30 characters/spaces, so the third line should begin at about the 60th character. The target letter is somewhere past the middle of the third line, about 20 units from the left margin. So, add 20 to 60 and your educated guess is 80!

Press '8' '0' and space. CoCo placed the cursor over 'U' of "FEATURE." Closing in fast! Space over to get to the space after 'E.' If you overshot the target, use the left-arrow key to return to the target location.

To insert a letter, press SHIFT 'I' together to get into the insert option, then press 'S.' Get out of insert mode and also the exit mode with ENTER.

It is safer to make one correction at a time, RUN and check out the result.

Come to think of it, the second "USED" is superfluous, so hit CLEAR EDIT30 and ENTER. "USED" is on the third line, which begins at about the 60th character/space. The target is about 20 spaces over. Once again, the educated guess is 80. Press '8' '0' and space. Not quite! Space over until the cursor is on top of 'U.' We want to delete five spaces, ("USED" and the following space). Press '5' (the number of spaces to be zapped) and 'D' to tell CoCo to delete the five spaces. Get out of the edit mode and check it out.

Now, we will delete "IS" and insert "ARE" in the same operation: CLEAR EDIT30 and ENTER. We recall that our educated guess was 80. Press '8' '0' and space, then space over so the cursor is on top of 'I.' We will leave the space after "IS" alone because we need a space after "ARE." To tell old faithful CoCo to delete two spaces, press '2' 'D.' They are gone! To insert "ARE," we must get into the insert mode. Press SHIFT and 'I' together and key in ARE. Get out of the edit mode with ENTER.

Due to deleting "USED IS" and inserting "ARE," about four spaces must be removed after "VARIOUS," so CLEAR EDIT30 and ENTER. Our target is on the fourth line. The fourth line begins at about the 90th character/space. It is about eight more spaces from the left margin. The educated guess is 98. Press '9' '8' and space over to the space after 'S.' First, we delete three spaces to be safe. Press '3' 'D' to delete them. Space over a few spaces to reveal what comes next. Sure enough, one more space to yank out! Use the left-arrow key to get over to either of the two spaces. Press 'D' and get out of edit.

Checking it out, we discover a new error. The last word must be moved left one space to align at the left margin. Press CLEAR EDIT30 and ENTER. The space between "EDITING" and "FEATURES" must be removed. Our educated guess will be 90 (beginning of the fourth line), and about 15 more to get to the middle. Press '1' '0' '5' and space over to the space to be extracted. Press 'D' and ENTER to get out of you know what!

The sentence is OK but is poorly worded. Let's look at the second display panel.

"EDITTING" in the top paragraph has one 'T' too many. Note that even if you edit the 'T' out, a comma will be on the next line. That is a no-no! Now, hit CLEAR EDIT60 and ENTER. It is on the fifth line, so it must be located about 120 characters/spaces from the beginning. Add about 15 more spaces because it is in the middle of the line. Press '1' '3' '5' and space: our educated guess. Space over to any one of the 'T's, and press 'D' and ENTER to get out of edit.

Now run to see the comma. We must insert a '-' after "EDIT" and add two blank spaces to fill the end of the line. "ING" must be placed on the next line.

Again, press CLEAR EDIT60 and ENTER. We know 135 is a good, educated guess. Press '1' '3' '5' and space over the 'I.' We tell CoCo to get into the insert mode: SHIFT 'I' together and press '-' and the space bar twice. ENTER and RUN to get out of the edit mode and check.

Now, we must put a space between "IN" and "THE" on the last line, so CLEAR EDIT60 and ENTER. Being lazy, press 'X' to get to the end of the line. Press the left-arrow key until you are on top of the target, 'T' of "THE." This killed the end of the line. Key in a space and the rest of the line. Get out of the edit mode and double-check your work.

Nuts! The second paragraph is not only grammatically incorrect, but "KOLARS" requires an apostrophe. Now, let's CLEAR EDIT70 and ENTER. Knowing that inserting "TO" after "LIKE" will knock out the alignment, and also that an apostrophe must be placed in "KOLARS," the best thing is to target "LIKE." Since "LIKE" is at the end of the second line, it must be at about location 60. Press '6' '0' and space, then left-arrow one space. SHIFT 'H' together to chop off the rest of the sentence. Using the EDIT 70 line above it on the screen as a guide, retype the rest of the sentence beginning with the missing "TO" and make sure to insert the apostrophe, then ENTER and check.

When you see problems arising, chicken out and retype the part of the line that will cause misalignment. We could separate the last line with a blank row. Find the proper line number and get in the edit mode. Now, CLEAR EDIT80 and ENTER. PRINT will be put at the beginning to create the blank row. SHIFT 'I' together, key in PRINT: or ?: and get out of edit. The text is fine. On to the graphics panel.

It could be raised about 10 spaces on the vertical axis for better centering. LIST it (you know it must be at the end of the listing). Sure enough, it is in lines 120 and 130. First, let us tack Line 130 to the end of Line 120 to keep the graphics on one program line, then EDIT120 and ENTER. Press 'X' to the end. Add the contents of Line 130 after the colon.

Note: CLEAR was not used so that the listed line would be on the screen for easy copying. Get out of edit and RUN. If the graphics look unchanged, then you have copied the contents of Line 130 properly. If a distortion appears, recheck your typing. LIST to make sure you are deleting the right line, then DEL130 and ENTER.

Now to raise the graphics higher on the display (10 units on the vertical axis), we subtract 10 from the vertical

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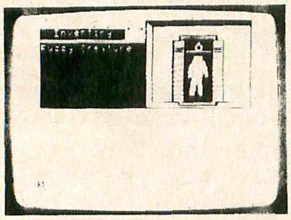

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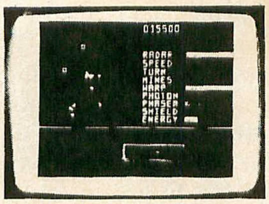

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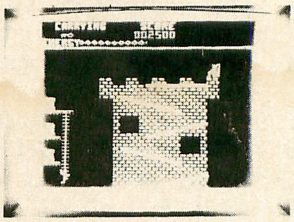

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component (y) of the four (BM x, y) that create the design.

CLEAR EDIT120, ENTER and space over to the '8' of 86 and press 'C' '7'; space over to '9' of 96 — Press 'C' '8.' Space over to the '1' of 106, press 'D' to remove the '1.' Make sure you are on top of '0' then Press 'C' '9.' Space over to the '9' of 92 and press 'C' '8' and get out of edit. If you want to fool around, move it left five units on the horizontal axis.

We will recreate a typing error that occurs in the normal course of events, so CLEAR EDIT200 and ENTER. You desire to press 'X' to get to the end of the line. Without realizing it, you press 'C' instead. The cursor did not move. Strange! You know CoCo moves to the end of the line automatically on 'X.' What you did was delete the first letter and CoCo was waiting for you to make a change. Therefore, if you press 'X' in the edit mode and nothing appears to happen, look at the reference line above and press the same key to replace the letter. If you don't replace the letter, it will be deleted and ruin the line.

Sometimes, when you are in the edit mode, you may forget to tell CoCo what you want to do. If the first letter you press is 'Q,' you will be jerked out of the edit mode and "OK" will be displayed. If the first letter pressed is 'A,' the line will be redisplayed. If it is 'E,' you will exit the edit mode. You know where 'X' will bring you. These errors are harmless, but startling; CoCo is keeping us on the alert. There are other EDIT features not covered that you may care to check out.

Try not to use RENUM while you are developing a program. If you RENUM in midstream, you inflict a lot of unnecessary woes. You get accustomed to a line being at 'X,' and all of a sudden it is at 'Y.' When you change a large number of lines, the confusion gets greater. Wait until you are finished debugging. As long as there is room to enter new lines between existing program lines, you have the luxury of postponing RENUM.

The next five tutorials will be a series on the various aspects of DRAW.

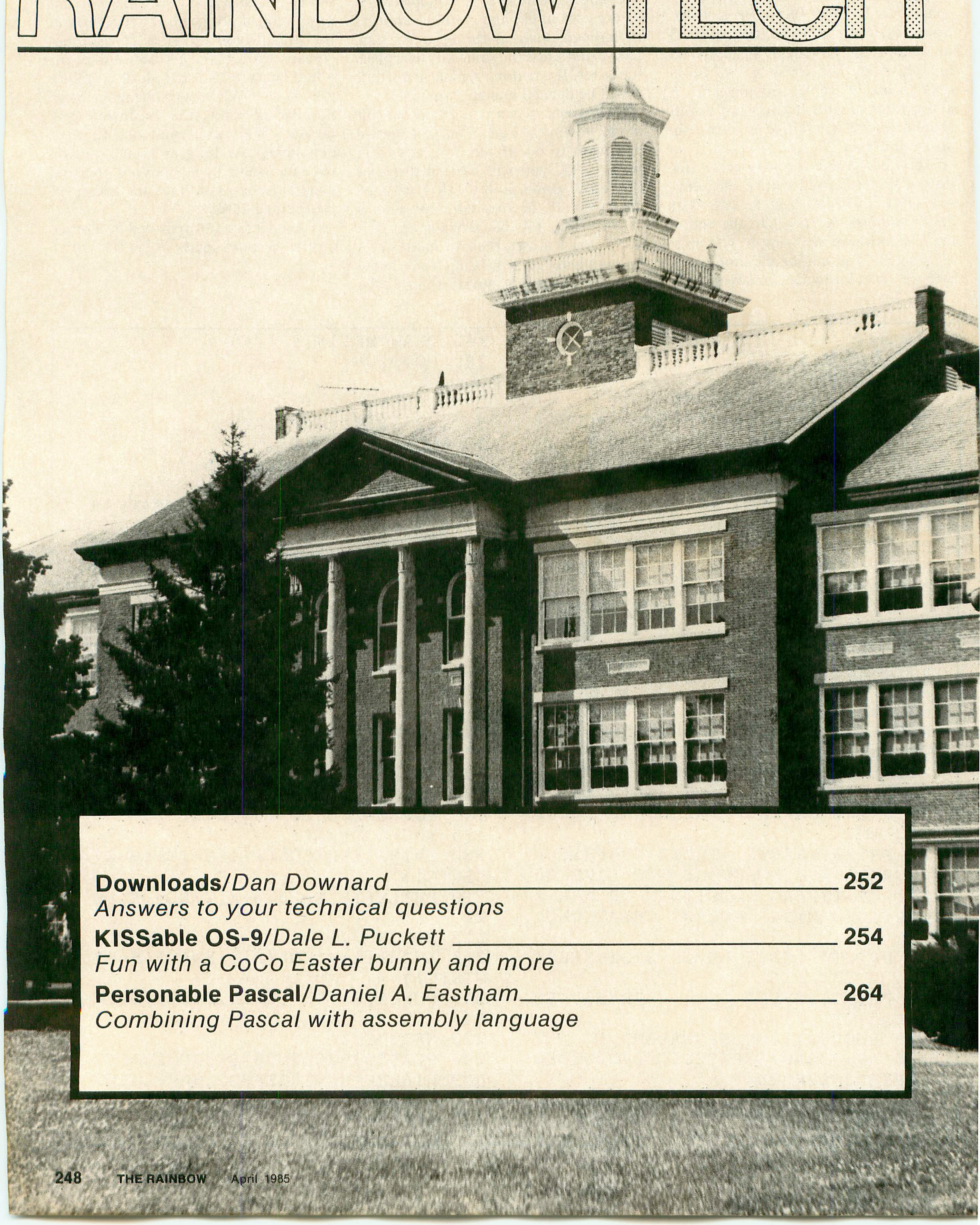
Listing 1:

```
0 'LISTING1
5 CLEAR500
10 '(C) 1984, J KOLAR
20 CLS:PRINT:PRINT"  THIS PROGRA
M IS TO BE USED AS A GUIDE TO VA
RIOUS HINTS CON-   CERNING THE E
DIT CAPABILITY OF  COCO.
30 PRINT:PRINT"  ASIDE FROM ACTU
ALLY PROGRAM-  MING, THE MOST FR
EQUENTLY USED  FEATURE USED IS T
HE VARIOUS     EDITING FEATURES
40 PRINT:PRINT"  IT IS HOPED THA
T YOU WILL GET A FEW NEW INSIGHT
S AS TO HOW TO PROCEDE IN AN EFF
ICIENT MANNER.
50 PRINT:INPUT"         PRESS <E
NTER>";AO
60 CLS:PRINT:PRINT"  A FEW MISTA
KES WERE PLACED    DELIBERATELY
TO ILLUSTRATE SOME SUGGESTIONS.
 IF YOU ARE AN EX- PERT, AND KNO
W ALL ABOUT EDITTING, SKIP THIS
TUTORIAL AND KEY INTHE GRAPHIC P
ROGRAM.
70 PRINT:PRINT"  THESE GRAPHIC P
ROGRAMS ARE FORTHOSE WHO LIKE PR
ACTICE TYPING  LISTINGS OR ARE I
NTRIGUED WITH  KOLARS CREATIONS.

80 PRINT"  COCO LOVES BEGINNERS!
"
90 PRINT:INPUT"       PRESS <EN
TER>";OA
100 PMODE4,1:PCLS:SCREEN1,1
110 A$="BL4U2E2R4F2D4G2L4H2U2BR2
UER2FD2GL2HUBD4"
120 DRAW"S12BM128,86"+A$:DRAW"BM
135,96"+A$:DRAW"BM124,106"+A$
130 DRAW"BM114,92"+A$
200 GOTO200
```

Listing 2:

```
0 'BOUNCY
5 '(C) 1984, J KOLAR
30 PMODE4,1:PCLS
40 A=126:B=90:R=80:S=15
50 DIM S(13),T(13)
60 DRAW"BM8,4NU4NL4NR4ND4NE4NF4N
G4NH4"
61 DRAW"BM28,8BL4U2E2R4F2D4G2L4H
2U2BR2UER2FD2GL2HU"
70 GET(0,0)-(12,16),S,G
71 GET(20,0)-(32,16),T,G
80 PCLS:SCREEN1,1
100 DRAW"A0S8BM90,74U6R3D3NL3RD4
NL4BR3NR4U6R4D6BR3NU6R4NU6BR3U5N
UF4NU5DBR3NR4U6R4BR3D2F2ND2E2U2"

110 DRAW"BM98,100U6R3D3NL3RD4NL4
BR3U6R4D4NL4D2BR3NU6R4BR3NU6R4BR
5U2H2U2BR4D2G2"
180 FOR Z=6 TO -30STEP-3
185 FOR S=200 TO 100 STEP-20
195 K=C+LOG(R)+Z
200 X=INT(A+R*COS(K)):Y=INT(B+R*
SIN(C))
210 PUT(X+12,Y+60)-(X,Y+80),S,PS
ET
212 SOUND50,1
213 X=INT(A+R*COS(K)):Y=INT(B+R*
SIN(C))
215 PUT(X,Y+60)-(X+12,Y+86),T,PS
ET
220 NEXT S,Z
230 PLAY"O3V25L8CV30EV25CO2BABV2
0O3CL16EEFFGGV15EEFFGGL8GFEL4CO2
V20BO3L2C"
240 GOTO180
```

RAINBOW TECH



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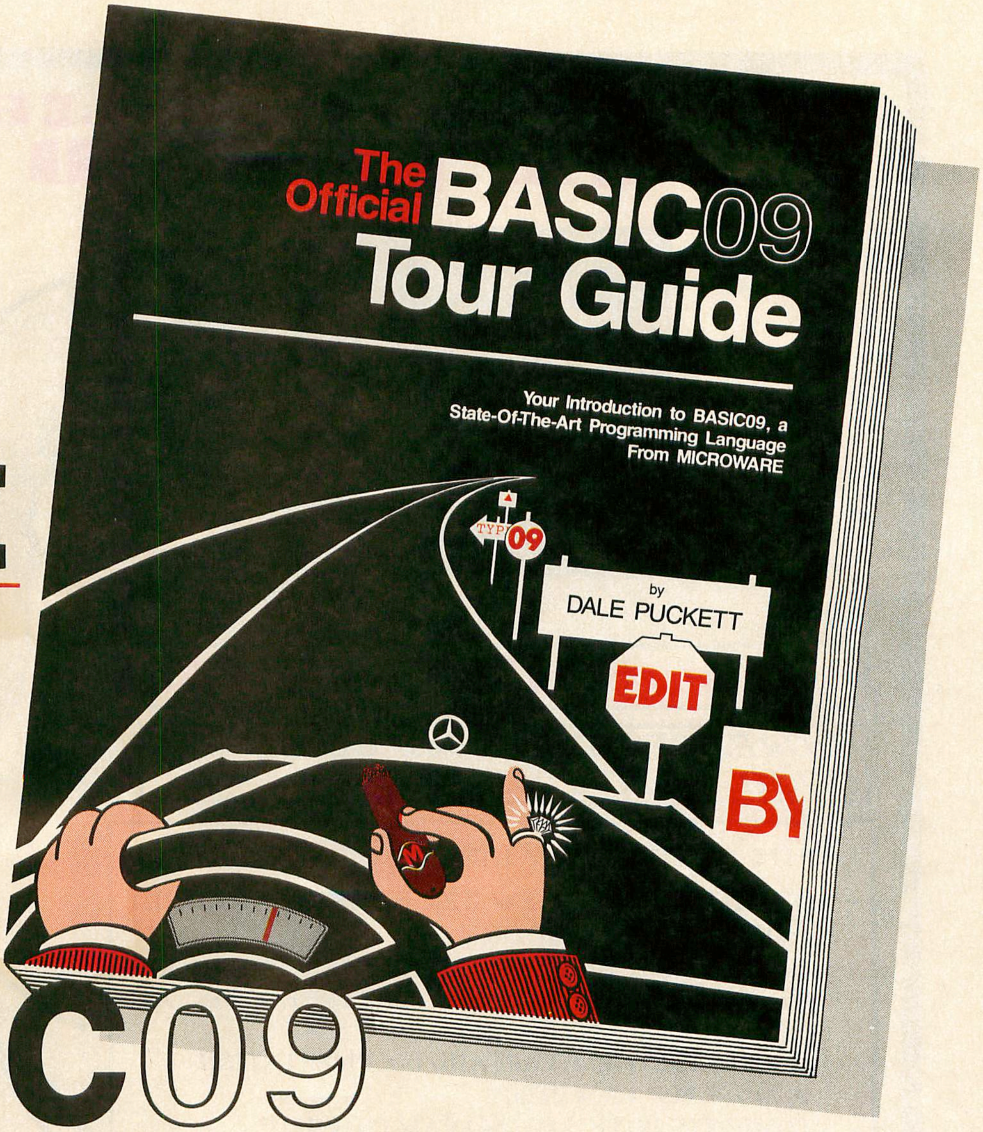
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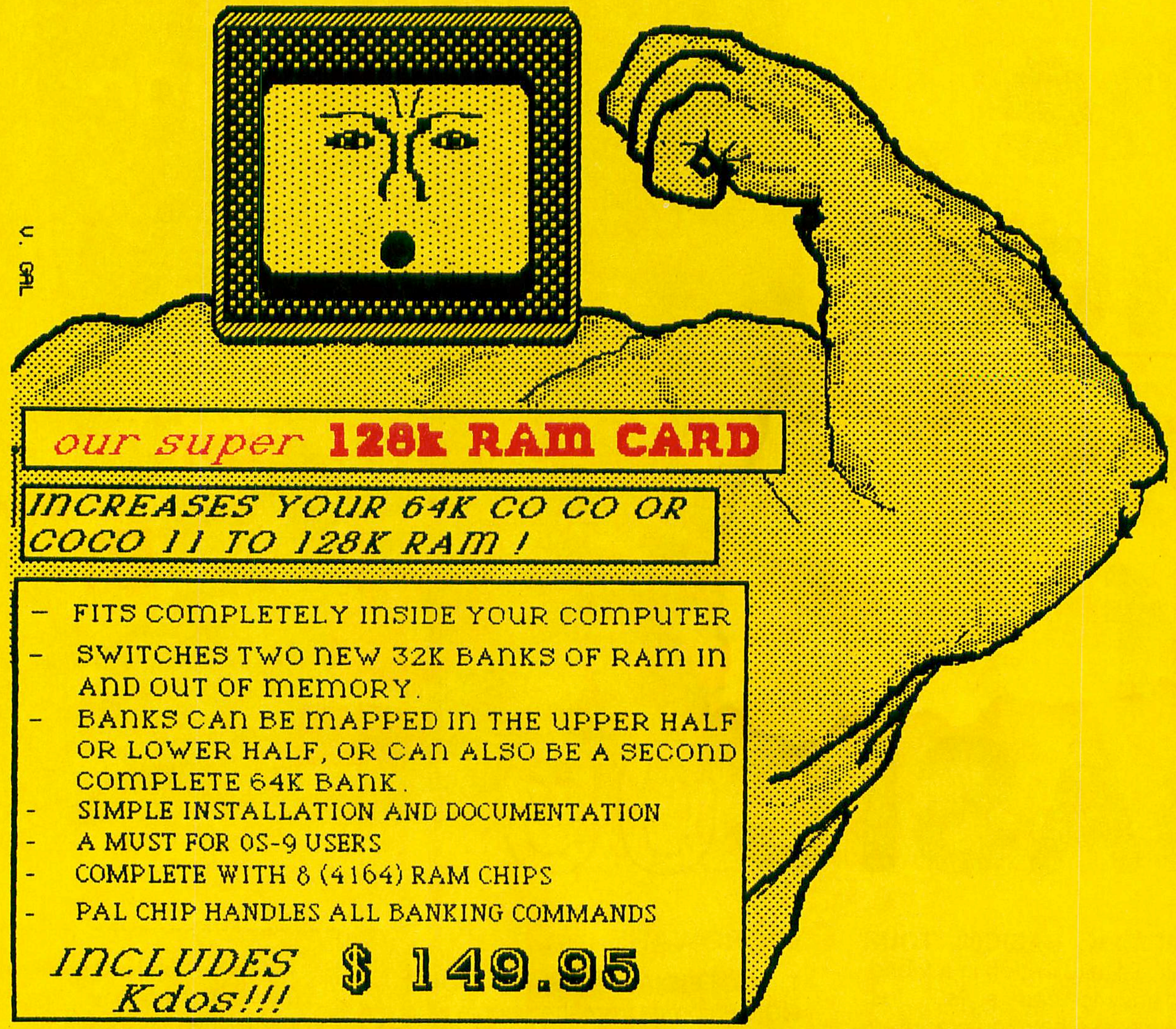

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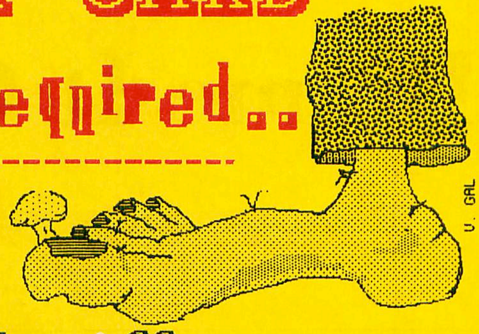

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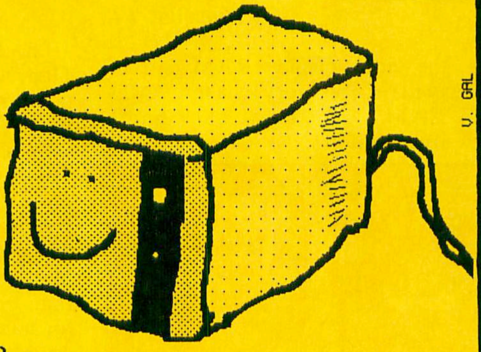

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Blame It On The POKE

By Dan Downard
Rainbow Technical Editor

• *For Christmas, I received a dual disk drive with a JDOS operating system.*

Being a RAINBOW and RAINBOW ON TAPE subscriber, I immediately discovered a problem. BASIC programs, for the most part, transfer and run successfully. The exception is one that uses the `POKE 25,6:POKE26,1` *for a* `PCLEAR0`*. The machine language programs don't work at all. I've tried several from my tapes, including your tape to disk, 40K BASIC, but with no luck.*

I called J&M and they told me ML programs probably wouldn't work. They also said many commercial programs wouldn't work, including Telewriter-64 *and the* Elite *series. They offered no solution.*

My question then relates to the ML problem or the low memory pokes, including being able to use programs that move BASIC to upper RAM. Being a complete novice in ML, did I make a mistake by buying JDOS? What, if anything, can I do? Are all ML programs that appear in RAINBOW going to be useless? Must I check for JDOS compatibility before buying programs? I have a 32K CoCo 'E' board upgraded to 64K.

Dick Emory
Reno, NV

When you use the `POKE 25,6:POKE 26,1` command, Dick, the pointers in low RAM are set to make BASIC think the program starts at $600. When using a disk, this memory is used for the disk system. Your BASIC program is wiping out this memory by overwriting your BASIC program. This is not a fault of JDOS. These POKEs will not work with Disk BASIC, either.

When using a disk system, the best thing you can do to clear unused memory is execute a `PCLEAR 1` command. If you are using Extended BASIC 1.0, put the `PCLEAR` command on the last line of your program.

Another method of freeing more memory is to look at the length of your maximum file and free the buffer space by using a `FILES` command. Disk BASIC reserves two files of 256 bytes each on start-up and this can sometimes be reduced.

The reason that so many programs don't work is that JDOS is a completely different program from Disk BASIC; a number of programs make calls to routines that don't exist in JDOS. Do inquire about compatibility.

VIDEO DISPLAY HUNT

• *I have an upgraded 64K Color Computer with Extended BASIC and I need some information on relocating the video display. The* Getting Started with Color BASIC *book has a* POKE *routine to do this, but it doesn't work with Extended BASIC. I would appreciate you advising me on how to relocate the video display.*

James Bullard
Titusville, FL

James, the video display RAM can be located anywhere in memory by a few POKEs into the SAM's registers. The magic addresses are as follows:

Address	Register
$FFC6	F0 SET
$FFC7	F0 CLEAR
$FFC8	F1 SET
$FFC9	F1 CLEAR
$FFCA	F2 SET
$FFCB	F2 CLEAR
$FFCC	F3 SET
$FFCD	F3 CLEAR
$FFCE	F4 SET
$FFCF	F4 CLEAR
$FFD0	F5 SET
$FFD1	F5 CLEAR
$FFD2	F6 SET
$FFD3	F6 CLEAR

By writing to the even registers, the respective bit will contain a one. Clear (odd registers) makes it zero. F6 through F1 make a six-bit binary number that defines the upper-left pixel of your screen. When your CoCo is initialized F2 is set, making the screen starting address $0400.

TWO FOR THE PRICE OF ONE?

• *Ever since upgrading my CoCo system with a disk drive, I have noticed the difference in the prices of single- versus double-density diskettes. What I would like to know is if I can store more data on a double-density diskette, or does that depend on the way the drive formats the diskette? (On my Atari 800 X2 D.O.S., the formatting procedure allows me to select single- or double-density formatting.)*

Can I save money and just buy single-density? And lastly, what density does the CoCo format in? I haven't noticed that the Disk BASIC offers any choices as far as density is concerned.

Dan Tharp
Pekin, IL

In the case of single-density diskettes, Dan, my favorite saying is "a penny saved could mean a lot of lost data." Your CoCo has a standard disk format of single-sided, soft-sectored, double-density (SSDD). These standards are defined by your Disk BASIC ROM.

You can use single-sided, single-density disks at your own risk. They will work *most* of the time, but what about the one time that one won't? As far as an option on formatting, why use single-density when double-density will store twice the amount of data?

SPOOLER SLOWS SPEED

• *I have a 64K 'E' revision CoCo with one disk drive (Radio Shack), a Multipak Interface and a Gemini 10X printer with a PBH Interface running at 9600 Baud. The DIP switches are set as factory settings, except for automatic line feed "On." When* `LLIST`*ing a program, everything runs at rated speed. However, when using any one of a number of commercially available spoolers, the printer slows dramatically. The only outward visible difference is a steady "ready" light on the printer when using a*

(Dan Downard is an electrical engineer and has been involved in electronics for 24 years through ham radio [K4KWT]. His interest in computers began about five years ago and he has built several 68XX systems.)

spooler and a blinking light without it. Why is this, and is there anything I can do to improve the speed?

Secondly, is there a PEEK *which will tell me if the Gemini is online?* PEEK(65314) *always contains a '4.'*

John Chapman
Doyleston, PA

John, even though computers are fast, they can only do one thing at a time. (That sounds like a good thing to tell your boss, doesn't it?) While your spooler program is operating, the CoCo is back at its BASIC prompt waiting for your input. The process of flashing the cursor and scanning the keyboard for your input takes time. While these events are taking place, the data cannot be output, since software timing loops are required for sending the RS-232 data to the printer.

If you PEEK(65314) and get a '4,' your printer is online and ready. A '5' would mean your printer is not online or the buffer is not ready for input. Actually, a better way to test for this signal is PEEK(65314) AND 1. If a '0' is returned, your printer is online. A '1' means it's busy. This masks out the rest of inputs of the PIA.

CARRIER DETECTIVE

- *As you have probably heard by now, the* BREAK *disable in the November '84* RAINBOW *was wrong. It detected a Control-L (OC) instead of the required Control-C (03). But don't fret, because a trap for OC has its uses, also. I've found that if an OC is sent while entering data into, say a* LINEINPUT *statement, it can cause you to lose the text inputted before the OC, by clearing the screen. My version of* REMOTE *has both traps in it.*

I run the CoCo Pub BBS, a BASIC *program running in* REMOTE *and JDOS. The program more closely resembles the Color-80-type BBS than a Rainboard. I have three double-sided, 40-track drives for over one megabyte of storage. The all-RAM mode and Error trap in JDOS comes in real handy. The number is (602) 899-1350, 24 hours a day.*

I've had some complaints from users that REMOTE *sends a linefeed before the carriage return, while most BBSs do the opposite. I don't think it really makes any difference, but it might to someone. Could you address this?*

My other problem is jokers that hang up in the middle of my program without going to the "goodbye" prompt. The result is all the text is sent to my modem while it is in the command state, and it could be randomly reprogrammed. Is there a PEEK *that will detect if the CoCo's carrier detect line is high or low? If it could be incorporated into* REMOTE *it could cause the* BASIC *program to be reset to the beginning, or else I could put it in my* BASIC *program somewhere to do the same.*

I have looked high and low for this carrier detect PEEK, *and I can't even find any commercial programs that use it. It's not the same as detecting if the printer is online or not. I can't believe such a useful tidbit has been left undiscovered.*

Stephen Roberson
Chandler, AZ

As far as your problem with line feeds before carriage returns, it is fairly simple to correct. Exchange lines 440 and 460 in the assembly listing. Another method would be to load the program and POKE &H3F34,&H0D:POKE&H3F39,&H0A.

Your second question is a little more complicated, Stephen. The carrier detect line of the modem is connected to the CA1 line of a PIA at address $FF21. By programming bits zero and one, you can detect the status of the carrier by reading bit seven. If anyone has a good short program for this, please send it and we'll publish it.

KOREAN 'K' CHIPS

- *I just purchased a Korean CoCo and am already eager to upgrade to 64K. What kind of chips do I need?*

Helen Meagher
Louisville, KY

Rumors on CompuServe have it that NEC uPD41254 will do the trick. You only need two, since they are 64K-x-4 chips. You'll have to wait awhile for Extended BASIC, unless you order it from Radio Shack National Parts.

LOOKING FOR A WELL-MANNERED MONITOR

- *I have a 1980 Extended* BASIC *CoCo, originally 4K, then 16K and now 64K. I have always been very unhappy with any TV set I have used as a monitor because of wavy lines, poor definition, etc.*

Recently, I have been seeing ads for color monitors such as Amdek Color-I in your magazine. Even though I have subscribed to THE RAINBOW *almost from its beginning, I cannot find any articles about monitors. I know one needs a monitor interface or adapter to attach the monitor to the CoCo, but what I really want to know is will I get a good, steady, sharp picture with one of these monitors? I understood Radio Shack has no subtitute for a TV set to be used as a monitor.*

Keith Currier
Long Key, FL

Keith, I use a monitor on my CoCo. I have no problems with wavy lines, etc. This is because you are eliminating the RF in the circuit. All of the monitors advertised in THE RAINBOW will work, but you need an interface that will allow the CoCo to output composite video. They are referred to as video drivers and require a modification to your computer. The ones I've seen come with adequate instructions. Join the crowd!

SOUR ON POWER

- *I have to tell you a story that you might find interesting. First, I would like, if possible, to put a little note in* THE RAINBOW *thanking RGS Micro, Inc., in Montreal, Quebec, for their incredible effort, kindness and patience. Here is my story: In December 1983 I bought a CoCo (TRS Color 2) at Radio Shack. Last summer (1984) I started to have a problem. As I was programming, the computer "froze" on me with garbage on the screen. I didn't know RGS then, so I got it repaired by a student in electronics.*

In October, I bought a monitor (Amdek), then had a color interface put in by RGS. It was fine for a while but in November the problem came back. I took it back to RGS and they told me that a high voltage resistor blew off; they didn't charge me for the repair. It did it again two more times in two months, garbage on the screen, picture freeze, etc. RGS told me there might be a problem in the board. I was very upset; I thought I would have to buy a new one, but they took the old one and gave me a new one free of charge. This was very nice.

I took it home and surprise! Ten minutes after it was turned on, the same problem! I took it back again, but then I started to investigate my house and found the problem. The electric company (Hydro Quebec) gives us 127 volts in the power line instead of 120. So I called an electrician and he told me that it is not normal to have 127 volts; it's not supposed to be more than 116 volts.

So we started to fight with Hydro Quebec with no results. They didn't want to rectify the power line, so I phoned RGS and they think it is the problem. Now, I am checking for a voltage regulator, but it's hard to find and very expensive. I don't know if I should give up.

I feel depressed about the whole thing. I love my computer and THE RAINBOW *(it is a fantastic magazine) and in one year, I have invested $2,000 in equipment. I cannot use my equipment now.*

Claude Massy
Chateaugway, Quebec

Claude, according to my information, the CoCo is rated for 105-130 VAC input voltage. From the symptoms you describe, I would check the monitor for a short, or leakage, that may be affecting your computer.

If you are indeed considering a way to reduce your voltage, try an autotransformer or a buck-boost transformer. They are normally cheaper than regulators. General Electric makes a component called an MOV that will protect your computer against spikes on the line.

Your technical questions are welcomed. Please address them to: Downloads, THE RAINBOW, P.O. Box 385, Prospect, KY 40059. We reserve the right to publish only questions of general interest and to edit for space and clarity.

KISSable OS-9

Fun With A CoCo Easter Bunny And More

By Dale L. Puckett
Rainbow Contributing Editor

Peter Dibble and I proofread each and every page of *The Complete Rainbow Guide to OS-9* during the past month and we wound up with quite an index. There are more than 400 pages packed with tutorials as well as scores of procedures and programs in 6809 assembly language, BASIC09 and C. We both hope you will like THE RAINBOW's new book, and find it a valuable tool as you pursue the mystery and power of OS-9.

Incidentally, if you don't like to type in programs from a book or magazine you can stand at ease. THE RAINBOW is also selling two disks that contain the programs and procedures listed in the book.

Finding the Easter Bunny

One of the things that makes doing this column a pleasure is the constant exposure to extremely creative people. During the past month, Frank N. Malaney of Pataskala, Ohio, proved our consensus and then went one better.

On Christmas Day, he brought much pleasure to his son, Mike, by applying his hacking skills with a real human purpose. It was refreshing to see Frank's approach, and since Easter is just around the corner, we thought we would share his effort with you.

Malaney had wanted to use the OS-9 User Group's 80,000 word dictionary with *DynaSpell*, so he wrote me to ask how he could get it in the right format. I sent him a disk with the dictionary converted and when he returned it, he sent along a disk of his with a program named *Mike*. The questions Frank asked his son will fit most American families with a number or name changed here and there.

You can change the name to "Pursuit of the Golden Egg" and let your children have some fun with the family's Color Computer just before the annual Easter egg hunt. Have fun figuring out how to draw an Easter bunny or Easter egg in the procedure named "tree."

More Shareware

Kevin W. Davidson of Easley, S.C., sent us an extremely useful program and wanted to share it with "KISSable OS-9" readers. *RSCopy* runs under OS-9 and lets you copy a file written by Extended Color BASIC to an OS-9 file. Unfortunately, it will not copy an OS-9 file to a Color Extended BASIC disk. But then, very few people that learn the ropes on OS-9 ever want to go back.

If you need a program to copy files the other direction, please send it to us so we can share it with our readers. You can buy a similar program at your local Radio Shack, but it will cost you $25. Because of Kevin's generosity, *RSCopy* is free here in THE RAINBOW.

While we're on the subject of sharing — Tim Grovac, the new editor of *MOTD*, the bimonthly newsletter published by the OS-9 Users Group, called today to say he is looking for hints and tips, procedures, programs, reviews or anything else you would like to share with fellow OS-9 hackers.

If you are looking for a good place to be published, send your items to him at *MOTD* Publishing, 25852 104th Avenue S.E., Suite 344, Kent, WA 98031. If possible, send it on a disk or leave it for him on CompuServe. His member number is 70445,217. Tim said not to worry about grammar or spelling, he'll take care of it for you. Just don't

---

(Dale L. Puckett is a free-lance writer and programmer who has worked with the Motorola family of microprocessors since 1976. He is the author of The Official BASIC09 Tour Guide, *published by Microware and has just completed* The Official Rainbow Guide to OS-9. *He serves on the InfoWorld Software Review Board and is a chief warrant officer in the U.S. Coast Guard.)*

THE OS-9 SOLUTION

by Jeff Francis

A COCO BREAKTHROUGH

Finally! The program that will make OS-9 your favorite CoCo operating system! OS-9 Solution is a program designed to create a "USER FRIENDLY" environment within OS-9. You will forget that you are using one of the most sophisticated and advanced operating systems ever written. This program makes OS-9 easy for everyone from novices to experts! Completely menu driven with prompts at all times. Built in "Help Screens" for run-time help. You may never see the OS-9 command prompt again!

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J - Jumble around filenames
K - Kompare files
L - Load in a file
M - Make directory
N - New directory (read it)
O - Output file
P - Put together files
Q - Quit OS9 Solution
R - Rename filename
S - Set destination directory
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forget to send us a copy to share with your friends who read "KISSable OS-9."

And, speaking of sharing, we received a nice letter from Suzanne Taylor. She hopes to form an active 68XX User's Group, complete with a FLEX software exchange library. If you're a FLEX hacker that has moved up to OS-9, but would still like to share some of your older creations with others, please contact Suzanne for information and submission forms.Wrtie to her in care of Aloha Software, P.O. Box 30107, Honolulu, HI 96820.

Show Biz with a Capital 'B'

If you want to get attention, send someone a special delivery letter on a Sunday evening. If you don't believe it, ask Bob Rosen of Spectrum Projects West Division (P.O. Box 9866, San Jose, CA 95157-0866).

I guess Bob was so excited about his new product, *The OS-9 Solution*, that he couldn't wait. Actually, I think he's just got a good sense of show business!

Rosen called his new product a major breakthrough that creates a "user-friendly" environment within OS-9. He talked about built-in "Help" screens, and said that 17 of OS-9's "user-hostile" (they never seemed that bad to me) commands can now be replaced by single keystrokes.

Actually, that part sounds pretty clever. *The OS-9 Solution* reportedly displays all your files in a directory window. All you have to do is move a cursor to the proper program name using your up-arrow and down-arrow keys. Sounds like we're going to see a "Wang" type interface on OS-9 soon. Bob promised to show us a copy in a week or two. Can't wait! We'll pass along our impressions.

We received a call from Jeanne Kaplan at Microware last week, reporting that the plans for the 1985 Microware OS-9 users seminar are already taking shape. Microware has changed the dates for the show this year, moving it away from the Iowa State Fair. Circle November 1-4 on your calendar right now.

This seminar is a must for true OS-9 hackers. Jeanne has arranged a special package for those who attend. You get three nights at the Des Moines Marriot, plus your registration at the seminar, for $350. It's a great show — don't miss it.

Other Basics Catching up with BASIC09

I had the chance to take a close look at Microsoft's new Version 2.0 release of BASIC for the Macintosh recently. Wow! It sure looks a lot like BASIC09. Not all the features are there, but many of the pluses OS-9 users have grown to love are just now appearing in many BASICs.

The "rest of us" can now write programs without line numbers and call subprograms, etc., just like we've been doing with BASIC09 for several years. Haven't seen a benchmark on Microsoft's new release yet, but since their code is not compiled like BASIC09, I doubt if it will be able to keep up with our 6809s.

An article titled "BASIC09, I Love You True," by George Dorner, inspired the paragraph above. George reported that True BASIC, the new effort from Kemeny, Kurtz, and others at Dartmouth, looks a whole lot like BASIC09.

Dorner cited an article in a new magazine called *Computer Language* that reported True BASIC doesn't require line numbers; includes sophisticated control structures like do-while, if-then-else, etc.; lets you write programs or functions as separate units; translates your code into intermediate code; and has a built-in debugger. Sure sounds familar doesn't it?

> ***"... thanks to the efforts of Paul Searby at Computerware and software author Brian Lantz, you can sit down with a menu and design a database in a few minutes."***

But, here's the kicker! It takes about 64K of memory to hold True BASIC's user interface, compiler, interpreter and run-time package. You need at least 128K to run an average program. BASIC09 is 22K, and we complain?

New Database Manager Written for OS-9

One of the things that has kept both FLEX and OS-9 out of the consumer market place is that there has never been much application software available that would let real people do real work. For years, everything on the market has been hacker-oriented. It's been great fun, but not too lucrative.

For example, we've never had a database management program that didn't have to have a hacker to run it. With earlier releases, you've always had to write dictionaries and design report forms with text editors before you could begin to enter or manipulate any data. Now, thanks to the efforts of Paul Searby at Computerware and software author Brian Lantz, you can sit down with a menu and design a database in a few minutes.

The *Databank Manager* is a giant step in the right direction. As soon as it arrived, I gave it the true test. I sat down and ran it without looking at the manual. I succeeded! That's the way software *should* work.

This program is also among the first to take advantage of Radio Shack's offer to license OS-9 for use with programs developed by third parties. *Triva Chase* is another OS-9 — in fact, it's written in BASIC09 — program that takes advantage of this arrangement.

Indeed, you do not even need OS-9 to run the *DataBank Manager*. Instead, you simply plug the disk into your drive and type `''DOS.''` OS-9 takes it from there!

But, remembering his hacker roots, Lantz lets bonafide OS-9 users have access to the program and you can run it from the OS-9 command line with ease. It even works with *O-Pak* from FHL and PBJ's *Word-Pak* and *Word-Pak II* for nicer dispays. If you don't own either of these, never fear: Lantz has written a Hi-Res driver that comes with the *DataBank Manager*.

When you start the program it gives you a menu with eight choices.

A — View or Update records
B — Print reports
C — Define record
D — Define display formats
E — Define report formats
F — Define access methods
G — Management utilties
H — OS-9 System interface

The prompts are a bit cryptic in places, but they were kept short so people who are running the program on the standard Radio Shack OS-9 32-character screen will have a coherent display.

In choices 'A' through 'F,' Lantz followed the rules and started the selection with an active verb. 'G' and 'H' would have been better if they were programmed to say "Use management utilities" and "Run other OS-9 program." Yet, all in all, the prompts make sense and you should be able to use this program without reading the manual.

Several nice features hide under the nice menus. For example, you can use the *Databank Manager*'s "derived fields" to do things such as calculate a simple payroll or generate invoices. You use the derived fields to combine the values of two or more other fields and store the result. You can add, subtract, multiply and divide in these fields.

Lantz has designed the structure of *Databank* files so they can be used from within BASIC09, Computerware's Random BASIC, C and PASCAL. Additionally, the management utilties, which were not shipped with the initial release of the program, will let you read and write *DynaCalc* files.

By the way, the *Databank Manager* also lets you validate the data when it is input. You do this by using special validation strings up to 27 characters long. For example, `''> 00000 AND <99999''` could be used to validate a field as a ZIP code. It also works fast. Because of this, it is a pleasure to use.

First Windows Come to OS-9

Steve Bliss has been working hard since the RAINBOWfest in Princeton, and last week I received a CARE package in the mail from Al at PBJ. Steve has added windows to his full screen programming editor, *Cbreeze*. PBJ is now shipping Version 2.0.0 of this product for its *Word-Pak* video display cartridges.

> ***"Cbreeze is a handy editor that's fast and easy to use. It's a good addition to the PBJ line and is especially suitable for programmers."***

Cbreeze will let you edit up to four files at once. And because of the windows, it is very easy to move text back and forth between files. You're no longer flying blind.

To create a window, you simply type `BREAK` to enter *Cbreeze*'s command mode and move the cursor to the beginning of the line where you want to start a window. You then type a simple command, `''split file name.''` In a split second, you will be looking at a split screen. You will see the text in your original file in window number one. Window number two displays the text from "filename." To move from window, you type the number of the target window and then depress the ENTER key.

Cbreeze is a handy little editor that's fast and easy to use. It's a good addition to the PBJ line and is especially suitable for programmers.

Here's the real clincher. Steve added the new windowing feature and increased the speed of the program without adding any length. As I said, he's been hard at work since Princeton.

And Finally, a Puzzle

Here's a program statement to try. Drop us a line with your reaction and we'll see if we can get an answer back to Jim Craig.

```
x=(a-b)**3
```

Jim reports that he gets an illegal argument error when the argument is less than zero. We'll see what we can cook up for May. Till then, keep on hacking!

Listing 1:

```
/* RSCopy -- a utility to read a Radio Shack Basic
              Disk from OS-9


   Usage:

              RSCopy /Dn/filename/ext outpath

   Compile:

              ccl RSCopy.c -m=5K     */

#include <stdio.h>

/* byte offset of file allocation table */

#define FAT_OFFSET 785921
#define  BOF           0

/* byte offset of directory entries */

#define DIR_OFFSET  788481

main (argc,argv)
  char *argv[];

  FILE *rsdisk, *os9disk;
  char name[8], ext[3];
  char rspath[5];
/*Color Disk BASIC directory structure */

  char fat[68];  /*File Allocation Table*/
  struct directory
    char d_filename[8];
     char d_ext[3];
     char d_type, d_ascii, d_first;
     int  d_used;
     char d_reserved[16];;

  struct directory dir;

/* functions */

int (fix_name)();
long (cvt_to_offset)();
int (compare_name)();
int (errck)();

register int i;
int gran;
char bufr[2304];

pflinit();
if (argc != 3)
   printf("Proper Usage: \n");
    printf("RSCopy /Dn/filename/ext outpath\n");
    exit(0);
fix_name(name, ext, rspath, argv[1]);
if ((rsdisk = fopen (rspath,"r")) == 0)
   printf ("Can't open RS disk%s\n",rspath);
    exit(errno);
```

STRATEGY

FRANCHISE

by Steve Hartford

Have you watched popular chain stores pop up all around you and thought about getting in on the action? Have you ever wondered what it would be like to own, operate, and expand you own franchise? This is your chance to test your business savvy!

In Franchise you begin with just one "Frank's" fast food restaurant but plan to expand rapidly! In the beautiful graphics of your office you review the financial statements of last week. Study your total gross sales from all stores (self-owned and franchises), your expenses (advertising, food, labor, equipment, etc.), net income, and your bank balance. Now you must make your management decisions regarding how much to spend on advertising, food, and the rest. Your decisions now will affect (positively or negatively) next week's financial statement!

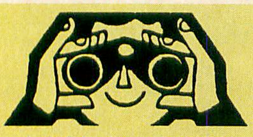
If the market is right you may sell another franchise which will bring in $20,000 up front and 7% of their gross thereafter. You will also want to scope out the competition too. McBurger and Taco Plus will surely try to squeeze you out!

But business isn't that easy! There are lots of little complications. Just one example is the health department inspections. They can fine or close a restaurant if the food quality drops too low! And from time to time you will be asked to help out at a restaurant. In arcade style action you will help with customer orders and how well you do will affect customer satisfaction!

Franchise is meant to challenge the mind. It also pleases the eye with beautiful graphics and tests the coordination with extra arcade interludes. Because this is a simulation of business and you make the decisions, it is different every time you play!

Requires 64K & joystick **Cass $24.95**
Disk $27.95

PROGRAMMING TOOLS



LOOK 'N LISTEN UTILITIES FOR OS-9

by Brian Lantz

Here is a set of utilities that will really expand your OS-9 capabilities. There is a new **hi-res screen** that will save more than 3.5K over Hires, and a variety of utilities for adding **sound!**

1) SCREEN is a new hires display that is compatible with most O-Pak software but is **27% faster.** You may select the color set (black on color or color on black), the cursor to blink or not blink, and either a block or underline cursor. There is an audible bell tone with definable length and tone. It has auto key repeat and cursor line inversion. You can home the cursor or go to a designated XY position. You can clear the entire cursor line, to the end of the line, or to the end of the screen. You can cursor right, left, up and down. And remember this utility **saves 3.5K** of precious memory!

Additional features you get when you install the included CCIO driver are: insert and delete a line at the cursor position, and shift right or left the cursor line 8 characters. Plus a complete **character set editor and loader** is included!

2) Stand-alone sound utilities, SOUND, VOICE and SND allow you to make sound through OS-9 independent of any additional hardware.

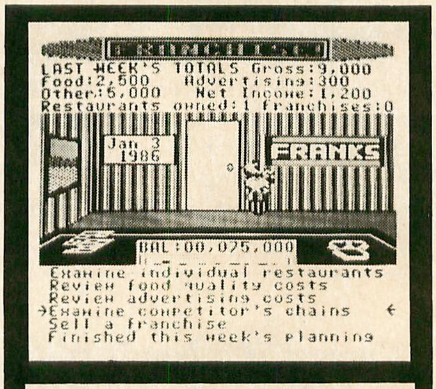
3) TALKER, TALK, and SPEAK are the driver, descriptor, and command needed to **use the Radio Shack SSC pak** to output speech from the keyboard or from text files.

4) Three "boot routines" included are:

- COLD.REBOOT returns the user to Disk Basic.
- WARM.REBOOT reboots the OS-9 from drive/DO.
- MAKE.RS.BOOT makes an OS-9 diskette bootable even with Disk Basic 1.0.

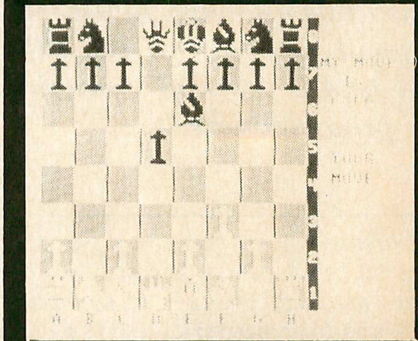
Requires 64K & OS-9 **$29.95**

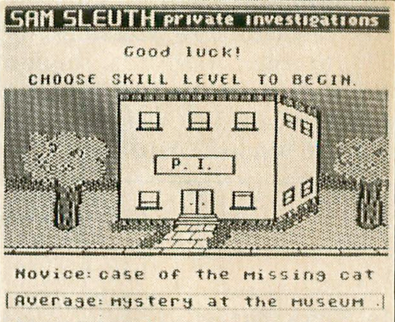
Computerware is a federally registered trademark of Computerware.



FRANCHISE
LAST WEEK'S TOTALS Gross:9,000
Food:2,500 Advertising:300
Other:5,000 Net Income:1,200
Restaurants owned:1 Franchises:0

Examine individual restaurants
Review food quality costs
Review advertising costs
→Examine competitor's chains ←
Sell a franchise
Finished this week's planning



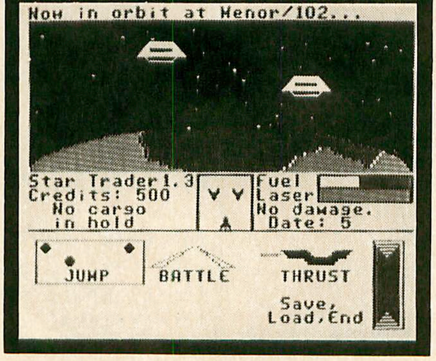


SAM SLEUTH private investigations

Good luck!

CHOOSE SKILL LEVEL TO BEGIN.

Novice: case of the missing cat
Average: mystery at the museum
Expert: baffling bank robbery



Now in orbit at Henor/102...

Star Trader 1.3
Credits: 500
No cargo in hold
Fuel
Laser
No damage.
Date: 5

VOX CHESS

by David Crandall

Vox Chess is always an eager opponent to test your chess skills against. You will enjoy the superb graphics of this game. And, if you have any of the voice paks that use the SC01 chip (Spectrum Projects. Speech Systems, Real Talker), **Vox Chess will talk to you!** You'll also appreciate the extra features like self-play, save and load previous games, set up a board layout, and exchange sides. Vox Chess is not the best player so if you're already an expert you may be able to beat him. For the beginner or even intermediate chess player he'll give you a good contest. And for everyone the graphics and speech are great fun!

Requires 32K **Cass $21.95**
Disk $24.95

SAM SLEUTH

by Steve Hartford

It was my first case and I was a little disappointed. I didn't become a private eye to find lost cats. But the lady was right when she said "you don't look overworked." I'd opened up the agency over a week ago and hadn't lined up job one. Besides, Shirley wasn't exactly your average lady! She explained that her friends had gone on vacation and left her to care for their cat. All was fine until this morning when she found the porch door open and the cat gone. Her friends were due back today!

I quickly learned the rules around the town of Elmsville. Reputation really played a part here. And not everyone exactly told the truth or were what I'd call cooperative. Judgement had to be my guide. . .

The next cases came quicker but were much harder to solve. Mr. Atherns was really upset when that ancient Mayan statue was stolen from his museum. I think the lapse of his insurance really put the heat on. And then I worked with good ole Sheriff Walker on the town bank robbery.

Sam Sleuth is a graphic simulation that will intrigue all. You'll enjoy the beautiful graphics as you guide Sam around town with the mouse or joystick. The three mysteries get progressively harder and each will change every time you play, giving endless challenge and fun.

Requires 64K & joystick or mouse
Cass $24.95 Disk $27.95

STAR TRADER

by Steve Hartford

Step into the business world of the future and become captain of a merchant starship. From the safety of your Color Computer you control your ship with joystick (or mouse) in hand. Your graphic cockpit shows read-outs of your location, current damage status, credit balance, cargo destination and due date, the location of any near-by starships, fuel and laser power levels, and the current date. Traveling between distant solar systems, you pick up cargo, deliver cargo, (maybe steal cargo or sell it on the black market), battle pirate ships, and best of all, make money! As you battle and travel you develop a reputation that will effect your future business and rewards.

With different skill levels and many variable factors, this graphic simulation offers the excitement and challenge of a new game every time you play.

Requires joystick or mouse and 32K for cassette or 64K for disk. **Cass $24.95 Disk $27.95**

ADVENTURE

COMPUTERWARE®

MAJOR ISTAR
UNDER THE DOOMED SEA

by BJ Chambless

SCENARIO: You travel to Trident Research Dome because an urgent call for help is received from one of the service driods stationed there. He said help was urgently needed, but before he could say why, his transmission was cut off!

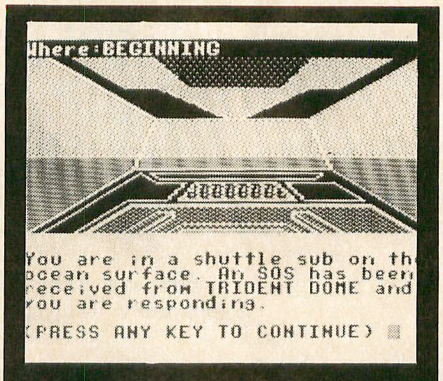
OBJECT: Solve the mystery at Trident in as few moves as possible.

SETTING: In the beginning of the 21st century undersea cities, interstellar spaceships, colonies in other planets and solar systems, worker driods, super computers, are all realities. One hero of the time is Major Istar. In the late 1990's when space exploration and colonies began, it was necessary to form a task force to offer help to all that needed it in these hostile environments. You, Cameron J. Istar, are a highly rated member of that team and you have never failed to solve a mystery!

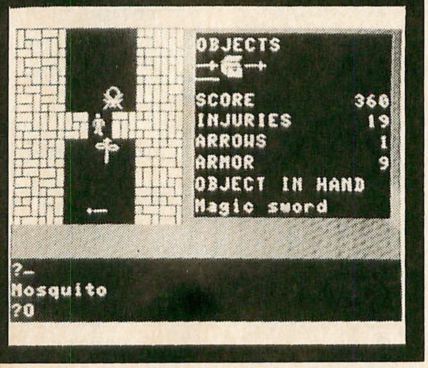
This is a graphics adventure like no other. There are 101 rooms, 33 objects, and 3 arcade sequences! It requires imagination, hand-eye coordination, logic, a sense of humor, and the willingness to take on a challenge!

Requires 64K & joystick

Cass $24.95 Disk $27.95



```
Where:BEGINNING
You are in a shuttle sub on th
ocean surface. An SOS has been
received from TRIDENT DOME and
you are responding.
(PRESS ANY KEY TO CONTINUE)
```



```
OBJECTS
SCORE            360
INJURIES          19
ARROWS             1
ARMOR              9
OBJECT IN HAND
Magic sword
?-
Mosquito
?0
```

COMPUTERWARE®

DUNGEON QUEST

Long ago, in a magic age, there lived a brave young lad named Brodric. When he came of age, his father gave him his share of the inheritance, an old rusty sword, and Brodric set out into the world. He heard a legend of an emperor of old, Darius, who had built a subterranean fortress as his home. On his deathbed Darius decreed that since he had no heir whoever would possess the crown would rule the empire. However, after his death no one could find the crown.

Brodric decided instantly that he would go on a quest for the crown. A fortnight or more later, Brodric reached the entrance to the fortress dungeon. He unsheathed his sword and stepped inside. Not five steps later the floor gave way and sent him tumbling downwards. . . Brodric awoke, got up, picked up his sword, and set out to find the crown!

You will see Brodric on your screen searching the passageways for the crown. As you guide him with your joystick you will earn points by gathering valuable objects like jewels and chalices. You may pick up extra weapons though you'll use your sword most. These are needed to battle the many monsters that inhabit the dungeon, like snakes, trolls, giant spiders, and more. You will encounter doors, some locked, and secret passages. Can you bring Brodric safely to the crown and earn the rank of Emperor for yourself?

Requires 32K & joystick

Cass $24.95 Disk $27.95

ACCESSORIES

COMPUTERWARE®

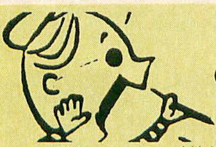
PUT A MONITOR ON YOUR COCO WITH VIDEO PLUS

If you are tired of fuzzy pictures or RF interference and want to see your CoCo's display clearly, we have good news! You can enjoy the crisp display of a **composite video monitor** using our Video Plus interface. Each is fully assembled and tested. Installation is quick, easy, and requires **no soldering.** Your TV output is not disabled by the Video Plus. Audio output is also provided. Choose the model right for your computer from the descriptions below.

Video Plus I $24.95
interfaces the original model of Color Computer to any composite video monitor (color or monochrome)

Video Plus IIC $34.95
interfaces the Color Computer II (model 26-3026) with either a color or monochrome composite video monitor. Computer must have video chip in socket.

Video Plus IIU $34.95
interfaces the newest Color Computer II (model 26-3134 & newer) with either a color or monochrome composite video monitor. Specially designed for those computers with video chips soldered rather than socketed.



COCO TALKER

by Frank Delargy

Have your CoCo read to you! Using your Radio Shack Speech/Sound Cartridge and CoCo Talker your computer can speak aloud, clearly and distinctly. This will truly impress your friends and dazzle your enemies!

CoCo Talker comes with a big dictionary of words that you can add to or change – or you can develop your own dictionaries – using the phonemes already programmed. CoCo Talker can read out a phrase or sentence entered from the keyboard or a long text you've already saved. An exception table specifies special pronunciations like when reading numbers or dollar values. For the accomplished machine language programmer, this translator can be interfaced to other machine language programs.

A fun "Talking Head" demo is included for free! So plug in your Speech/Sound cartridge and listen up. CoCo Talker is about to make a speech!

Requires 32K & Radio Shack Speech/Sound Cartridge

Cass $21.95 Disk $24.95

COMPUTERWARE®

MONITORS

NAP Monochrome Monitors

This great 12" monochrome monitor is the perfect match for the CoCo. The 20 mhz band width, 800 line resolution, and 80 x 25 display insure a crisp picture for word processing, programming, or just great fun. The non-glare screen and streamlined style is also attractive. Plus – it has audio input! There isn't a better monitor for the money!

NAP 12" Green $104.95 **NAP 12" Amber $114.95**

Color Monitor

If you are looking for the crisp, bright display of a compact 13" color monitor for your CoCo, this is it. Resolution is 350 lines x 350 lines, giving an excellent display.

$275.00

Call or Write to:

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5% for orders over $100
Checks are delayed for bank clearance

6% Calif. Sales Tax ______
COD Add $5 ______
Shipping* ______
TOTAL ______

```
/* locate file allocation table */

if (fseek (rsdisk, FAT_OFFSET, BOF))
    printf ("Seek to FAT Failed\n");
     exit(errno);

/* Read in File Allocation Table */

if (fread (fat, sizeof(fat),1,rsdisk) == 0)
  printf("F.A.T. read failed\n");
   exit(errno);

/* locate directory */

if (fseek (rsdisk, DIR_OFFSET, BOF))
   printf("Seek to directory failed\n");
    exit(errno);

for (i=0; i<72; i++)
   if (fread (&dir,32,1,rsdisk) == 0)
      printf ("Directory read failed\n");
       exit(errno);

   if (compare_name (&dir, name, ext) == 0)
      break;

if (i == 72)
   printf ("Directory entry not found\n");
    exit(0);

/* Open Output File */

if ((os9disk = fopen (argv[2],"w")) == 0)
   printf ("Can't open OS-9 disk\n");
    exit(errno);

/* Copy whole granules */

gran = (int)dir.d_first;
while (fat[gran] > 0)
   fseek (rsdisk, cvt_to_offset(gran),BOF);
   errck(rsdisk);
   if (fread (bufr, 256, 9, rsdisk) == 0)
   printf("Data read failed");
   exit(errno);
fwrite (bufr, 256, 9, os9disk) ;
   errck(os9disk);
   gran = fat[gran];

fseek(rsdisk, cvt_to_offset(gran), BOF);
errck(rsdisk);
gran = (fat[gran]&0x3f) -1;

/* Read last sector */

fread (bufr, 256, gran, rsdisk);
errck(rsdisk);
fwrite(bufr, 256, gran, os9disk);
errck(os9disk);

/* Read last bytes */

fread (bufr, dir.d_used, 1, rsdisk);
errck(rsdisk);
fwrite(bufr, dir.d_used, 1, os9disk);
errck(os9disk);
printf("Bytes in file: %ld\n",ftell(os9disk));
fclose(rsdisk);
fclose(os9disk);

/* Convert a granule to a byte offset */

long cvt_to_offset (gran)
int gran;
 if (gran < 32 )
    return (long)gran * 23041;
  else
    return ((long) gran +21) * 23041;

compare_name (dir, name, ext)
  char dir[], name[], ext[];

  int strncmp();
  return
     strncmp (dir, name, 8)
     strncmp (&dir[8], ext, 3);

fix_name (name, ext, rspath, cmd)
  char name[], ext[], rspath[], cmd[];

   register int i;
    int j;

    rspath[0]=cmd[0];  /* "/" */
    rspath[1]=cmd[1];  /* "D" */
    rspath[2]=cmd[2];  /* "n" */
    rspath[3]='@';
    rspath[4]=0;
    for (i=0; i < 8 ; i++)
        name[i] = ' ';
    ext[0]=' ';
    ext[1]=' ';
    ext[2]=' ';
    j=0;
    for (i=4; i < 13
              && cmd[i] != '\0'
              && cmd[i] != '/'
              && cmd[i] != '.' ; i++)
    name [j++] = cmd [i];

    j = 0;
    for (i++; i < 16 && cmd[i] != '\0'; i++)
         ext[j++] = cmd[i];
    return;

/* errck, Check file error and print */

errck(fp)
FILE *fp;
if (ferror(fp))
  printf("File Error");
   exit(errno);


that's it
```

Listing 2:

```
PROCEDURE mike
SHELL "tmode -pause"
PRINT CHR$(12)
PRINT
PRINT
PRINT
```

```
PRINT "Welcome to the game of PURSUIT OF THE GOLDEN EGG"
PRINT "Where you can find the best Easter Egg of all!"
PRINT
PRINT
PRINT "Get ready to begin"
PRINT "(        Don't push enter key except when answering
        questions!!!)"
RUN delay(7000)
10 PRINT CHR$(12)
PRINT
PRINT
PRINT
PRINT "To find your present, it is only necessary to"
PRINT "answer a few simple questions that anyone"
PRINT "who has been a Malaney in this house should"
PRINT "know without hesitation.   (HA-HA-HA)"
RUN delay(5000)
PRINT CHR$(12)
PRINT "The first question has to do with the living room"
PRINT "you have been in it hunreds of times and, of course,"
PRINT "you remember everything in detail about that room!"
PRINT
PRINT "Now-- For the question"
PRINT
PRINT
INPUT "How many pictures are there on the north wall   ",n
IF n=4 THEN
RUN white
PRINT "Congratulation on your first correct answer"
RUN delay(3000)
ELSE
PRINT CHR$(12)
PRINT
PRINT
PRINT
PRINT " I am really suprised at you, Mike. I thought'
PRINT "you would be doing better at this than you are."
PRINT
PRINT
PRINT "May I suggest you do a little research before you answer"
RUN delay(5000)
GOTO 100
ENDIF
RUN white
PRINT "Now for a little change of pace.  The next question"
PRINT "to do with the family in general.  You do know all"
PRINT "about our family-    Don't you???"
RUN delay(2500)
PRINT
INPUT "What is Grandma Feiler's middle name?  ",A$
IF A$="" THEN
RUN white
PRINT "You have now answered two questions correctly"
PRInT "Just a few more proper and correct answers and"
PRINT "you will have that present of your wildest dreams"
RUN delay(4000)
ELSE
RUN white
PRINT "I thought you would really know this one"
PRINT
PRINT "I think you had better go and ask her"
RUN delay(3500)
GOTO 100
ENDIF
RUN white
PRINT "Now, for the toughest question of the whole"
PRINT "game.  If you get this one, you are really on "
PRINT "on the ball"
PRINT
PRINT
INPUT "How many light bulbs are there outside of the house ",n
RUN white
IF n=15 THEN
PRINT "Boy- Am I impressed with the scope and"
PRINT "breath of your knowledge on these topics"
RUN delay(3500)
ELSE
PRINT "Well, I told you it was tough and it is tricky"
PRINT "I can only suggest that you look far and wide"
PRINT "as you seek the solution to this one"
RUN delay(7000)
GOTO 100
ENDIF
RUN white
PRINT "Boy, I hope it wasn't too cold out there for you"
PRINT
PRINT "The answer to the next question is inside so you"
PRINT "will have a chance to warm up before I have you"
PRINT "counting all the trees in the orchard."
PRINT
INPUT "How many lights in the dining room chandelier?  ",n
RUN white
IF n=6 THEN
PRINT "It was sure easier counting these then all those
        lights"
PRINT "on the outside. I think this question was almost too
        easy "
RUN delay(4000)
ELSE
PRINT "Come on, Mike. You are going to have to get off"
PRINT "this chair and go down and COUNT. (I am sitting"
PRINT "on it too while programing)"
RUN delay(5000)
GOTO 100
ENDIF
RUN white
PRINT "Now, for a question from your past. I hope"
PRINT "you can remember back to that period when you"
PRINT "were taking piano lessons. If you can it will"
PRINT "help you on this question"
PRINT
INPUT "Last name of the composer of 'Silent Night'-  ",A$
RUN white
IF A$="Gruber" OR A$="gruber" THEN
PRINT "Gee, that was simple. I think you need"
PRINT "tougher questions! "
RUN delay(3500)
ELSE
PRINT "Silent Night, Holy Night"
PRINT "All is calm, All is bright"
PRINT
PRINT "Remember those are the words"
PRINT "Who wrote them is the question"
RUN delay(6000)
GOTO 100
ENDIF
RUN white
PRINT "One more question on the Piano. (I would really"
PRINT "be surprised if you don't know this one.)"
PRINT
INPUT "How many keys on the keyboard? ",n
RUN white
IF n=88 THEN
PRINT "Maybe you should play a rousing chorus"
PRINT "of 'Happy Days Are Here Again'. Well,"
PRINT "enough of this levity. Let's get on "
PRINT "with the game. I'm sure you are getting excited"
PRINT "about your present"
RUN delay(7000)
ELSE
PRINT "Mike, how could you miss that one?"
RUN delay(3000)
GOTO 100
ENDIF
RUN white
PRINT "Meanwhile- back at the ranch"
PRINT "(They always had that line in the old"
PRINT "western movies I watch as a kid and I"
PRINT "thought it was a good line.) Let's do"
PRINT "a tough one"
PRINT
PRINT "On the face of the grandfather clock is"
PRINT "a Latin expression."
INPUT "What does the first word mean? -",A$
RUN white
IF A$="time" THEN
PRINT "You are getting closer now. Only one more"
PRINT "question to go before you receive the present"
PRINT "you have been waiting for."
RUN delay(4500)
ELSE
PRINT "O.K. Mike- I know that this may be a tough one"
PRINT "for you. But, stick with it. You have lots of"
PRINT "time to solve this game. Your present will not"
PRINT "rot or get moldy"
RUN delay(5000)
GOTO 100
ENDIF
RUN white
PRINT "Whoopie- you almost have the complete solution"
PRINT "to this fun game in your quest for the ultimate"
PRINT "Christmas present.  Let's get to the final question"
PRINT "and finally be done with this"
RUN delay(5500)
INPUT "In what year were Grandma and Grandpa Married? ",n
RUN white
IF n=1934 THEN
PRINT "CONGRATULATIONS"
PRINT
PRINT "You made it to the end"
RUN delay(4500)
RUN tree
ELSE
PRINT "Oh, come on, Mike. You know better than"
PRINT "that. Get out a pencil and paper and work"
PRINT "it out"
RUN delay(5000)
GOTO 100
ENDIF
END
100 PRINT CHR$(12)
PRINT
PRINT
PRINT
PRINT "As a result of your incorrect response, you will"
PRINT "have to start over again.  Please try to be more"
PRINT "precise in your answers"
PRINT
PRINT
PRINT
INPUT "Are you ready?  -",A$
GOTO 10
PROCEDURE delay
PARAM n:INTEGER
FOR x=1 TO n+n/4
NEXT x
PROCEDURE white
PRINT CHR$(12)
PRINT
PRINT
PRINT
PROCEDURE tree
PRINT CHR$(12)
PRINT "                 B
PRINT "                / \"
PRINT "               /   \"
PRINT "              /_____\"
PRINT "              /      \"
PRINT "             /        \"
PRINT "            /          \"
PRINT "           /____________\"
PRINT "                 "
                _
```

```
PRINT
PRINT "           MERRY CHRISTMAS"
PRINT "                 TO"
PRINT "                MIKE"
PRINT
PRINT "          Your present is"
FOR n=1 TO 10000
NEXT n
PRINT "      on top of the bookcase"
PRINT
PRINT
PRINT
```

Listing 3:

```
PROCEDURE Program
DIM word,lastword:STRING
DIM dic:BYTE

OPEN #dic,"nl7":READ

lastword:=""
PRINT "looking for double words!"
PRINT

WHILE NOT(EOF(#dic)) DO
READ #dic,word
IF word=lastword THEN
PRINT CHR$(7)
PRINT word
ENDIF
lastword:=word
ENDWHILE
PRINT
PRINT "file read complete!"
CLOSE #dic
END
that's all on th
```

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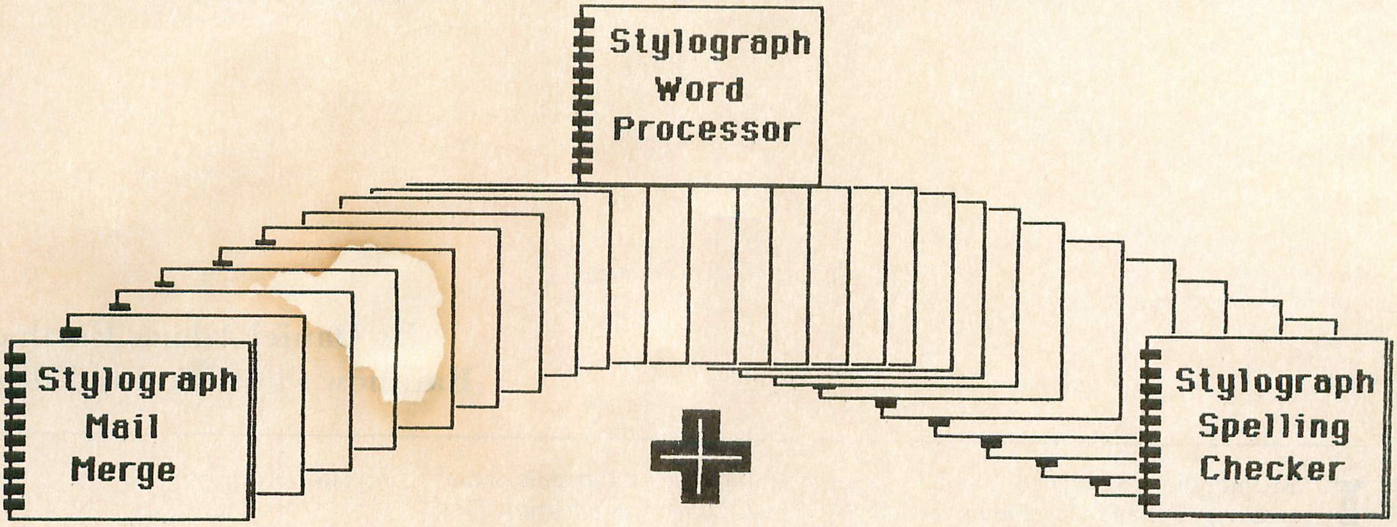

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PERSONABLE PASCAL

Combining Pascal With Assembly Language

By Daniel Adams Eastham
Rainbow Contributing Editor

Last month, we learned about breaking up and developing a PASCAL program in pieces called *modules*. There were several good reasons for doing this, one of which was to allow you to develop each module in a different language.

This month, we are going to use this capability to develop a small graphics program written in a combination of PASCAL and 6809 assembly language. I am going to assume you are familiar with the 6809 instruction set and the general conventions of an assembler.

PUBLIC and EXT

When writing a program composed of multiple PASCAL modules, we used the public directive to identify those procedures, functions and variables which were defined locally, but were to be used by other modules. In those other modules, we used the same name, but declared the item as *external*. This indicated the procedure, function or variable that we were going to use was defined in another module.

When one of these modules is written in *DEFT* Macro/6809 assembly language, we can do exactly the same thing. For example:

```
               PUBLIC MYSUBROUTINE
MYSUBROUTINE EQU    *
               ...
```

In this case, we have a local routine called MYSUBROUTINE which has been declared as PUBLIC. We can then use the name MYSUBROUTINE in a PASCAL module to declare an external procedure:

```
PROCEDURE MySubroutine;
EXTERNAL;
```

Although the assembler requires all uppercase, the PASCAL compiler can take upper- and lowercase. All symbols are actually maintained as all uppercase. Any time MySubroutine is invoked in this PASCAL module, the assembly language routine MYSUBROUTINE will actually be invoked. This same subroutine can also be referenced in another assembly language module as follows:

```
MYSUBROUTINE EXT
             ...
             LBSR MYSUBROUTINE
```

In this case, the assembler generates the opcode for the LBSR instruction and then leaves a directive for the linker to fill in the relative address to MYSUBROUTINE. When the final binary image is created by the linker, the LBSR instruction will be completed and reference the original public routine.

Using Public Variables

Since the linker takes care of actually computing the proper addresses for these public symbols, we could use this facility alone to communicate between PASCAL and assembler. For example:

```
...
VAR PUBLIC Parm1 : Integer;
           Parm2 : Char;

PROCEDURE MYSUBROUTINE;
EXTERNAL;
...
Parm1 := 5;
MYSUBROUTINE;
IF Parm2 = 'C' THEN ...
```

This PASCAL code could be used to invoke the following assembly language subroutine:

```
PARM1        EXT
PARM2        EXT
             ...
             PUBLIC MYSUBROUTINE
MYSUBROUTINE EQU    *
             ...
```

(Daniel Eastham holds a B.S. in computer science and has 14 years experience in systems and communications programming, including work on the original Telenet packet switching network. He is the author of the DEFT Pascal Workbench *and* DEFT Extra, *and is currently president of Deft Systems, Inc.)*

```
        LDD     PARM1,PCR
        ...
        STA     PARM2,PCR
        ...
        RTS
```

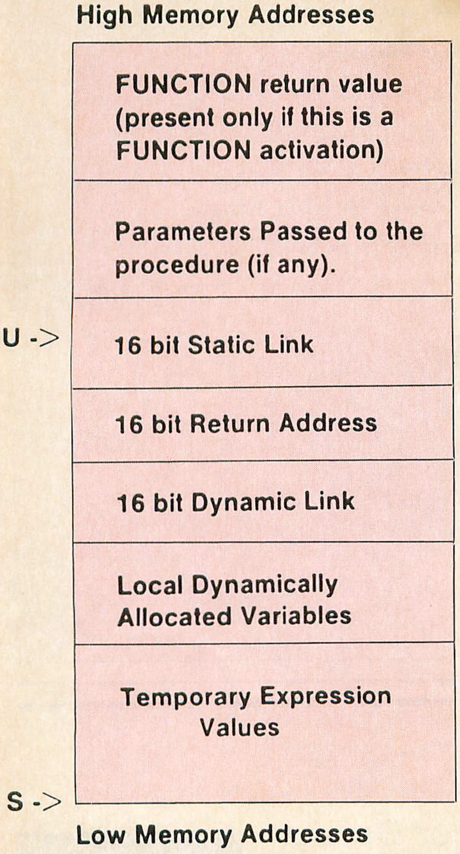
In this case, the public variables are defined in the PASCAL module and referenced externally by the assembly language routine. PARM1 is a 16-bit input parameter to MYSUBROUTINE, and PARM2 is an eight-bit returned value. The PC-relative addressing mode is used to provide *position-independent code* (PIC).

The only registers that an assembly language routine has to preserve are the 'S,' 'U' and 'DP' registers.

Using the Stack

The only problem with public variables is that they are public. That is, any module can reference and possibly, accidentally, clobber them. You can privately pass data to an assembler routine by using the standard PASCAL parameter passing conventions.

Any time a PASCAL procedure or function is activated, a stack frame is formed as follows:


High Memory Addresses
FUNCTION return value (present only if this is a FUNCTION activation)
Parameters Passed to the procedure (if any).
U ->
16 bit Static Link
16 bit Return Address
16 bit Dynamic Link
Local Dynamically Allocated Variables
Temporary Expression Values
S ->
Low Memory Addresses

This stack frame is formed partially by the calling procedure and partially by the called procedure. Everything down to the 16-bit Return Address is set up by the calling procedure. For assembly language routines, it is not generally necessary to set up the remainder of the stack frame.

Parameters on the Stack

Parameters are pushed on the stack in the order in which they are declared in the procedure. The sizes of the various types when loaded on the stack are:

All ordinal types	2 bytes
Reals	7 bytes
Pointer	2 bytes
Set	32 bytes
String	string size + 1
Arrays and records	sum of components
VAR parameter	2 bytes

Although a real variable only uses six bytes, an additional byte is always added when one is loaded on the stack in order to limit loss of precision.

Ordinal types use either one or two bytes as variables, however, two bytes are always used on the stack. For those ordinal types that only require one byte, the value will be in the low-order byte of the parameter word. For example:

```
PROCEDURE ASMSUB (VAR Parml : MyArray; I
: Integer; C : Char);
EXTERNAL;
```

The corresponding assembly language routine would look like this:

```
PARM1         EQU    8
I             EQU    6
C             EQU    4
              PUBLIC ASMSUB
ASMSUB        LDX    PARM1,S
```

Listing 1:

```
00 0000   (**********************************************
00 0000   *
00 0000   *     Program to draw lines in hi-resolution and
00 0000   *     count the number of pixels set.
00 0000   *
00 0000   **********************************************)
00 0000
00 0000   PROGRAM Graphics;
00 0000
00 0000   CONST VCRegister  = $FF22;
00 0000         VDGRegister = $FFC0;
00 0000         PageRegister  = $FFC6;
00 0000
00 0000         VCRValue = $F0;
00 0000         VDGValue = 6;
00 0000         ScreenPage = 10;
00 0000         ScreenAddr = 5120;
00 0000
00 0000   TYPE  Screen = ARRAY[0..$17FF] OF Char;
00 0000
00 0000   VAR PUBLIC
00 0003         Address    : ^Screen;
00 0005         BitMask    : -128..64;
00 0006         DeltaX     : Integer;
00 0008         DeltaY     : Integer;
00 000A         RowOffset : -32..32;
00 000B
00 000B   (**********************************************
00 000B   *
00 000B   *     Assembler line drawing routines
00 000B   *
00 000B   **********************************************)
00 000B
00 000B   PROCEDURE Horizontal;
10 000B   EXTERNAL;
00 000B
00 000B   PROCEDURE Vertical;
10 000B   EXTERNAL;
00 000B
00 000B   FUNCTION PixelOn (X,Y : Integer) : Boolean;
10 000B   EXTERNAL;
00 000B   (**********************************************
00 000B   *
00 000B   *     SetBits
00 000B   *     This routine sets up the bits in the specified
00 000B   *     graphics register to the specified value
00 000B   *
00 000B   **********************************************)
00 000B
00 000B   PROCEDURE SetBits (Bits,    (* the value to set  *)
10 000B                     Count,   (* bit size of value *)
10 000B                     Addr     (* register address  *)
10 000B                         : Integer);
10 000B
10 000B   TYPE RegLayout = ARRAY[1..8, 0..1] OF 0..1;
10 000B   VAR  RegisterPtr : ^RegLayout;
10 000B        I : Integer;
```

```
LDA     0,X         get array element
...
LDD     I,S         get integer
...
LDA     C+1,S       get character
...
RTS
```

Since the parameters are pushed in the order they are declared, the first parameter will be the farthest up on the stack. The last parameter will always have an offset of four.

Since Parm1 is a VAR parameter, only its address is pushed on the stack. The assembly language routine puts this address in the 'X' register and then references the array elements using an indexed addressing mode. The integer 'I' is easily used by the assembly language routine directly off the stack. The character 'C' is actually located in the low order byte of the word that was pushed on the stack.

Graphics Program

This month's example program contains procedures for setting up the graphics registers as well as drawing lines and interrogating pixels in high resolution. Starting with the PASCAL listing, you can see the constant declarations for the graphics registers followed by the definitions of the values to go into those registers.

The public variables Address through RowOffset are used to pass data to the assembler routines Horizontal and Vertical. The assembler function PixelOn has two formal parameters plus a return value.

The procedure SetBits is used to set the value of an address-mapped graphics register. These registers use accesses of even and odd addresses within a set of addresses to determine the one or zero status of individual bits within the register. The type RegLayout is a two-dimensional array defining the memory layout of this type of access and RegisterPtr is a pointer to a RegLayout. The passed address is put in RegisterPtr and a FOR loop is used to set each bit of the register appropriately.

The procedure DrawLine draws a

```
10 000B
10 000B   BEGIN
11 0011     RegisterPtr := PTR (Addr);
11 0015     FOR I := 1 TO Count DO BEGIN
12 0027       RegisterPtr^[I, Bits AND 1] := 0;
12 0051       Bits := Bits LSR 1;
12 0067       END;
11 0072   END;
00 0076   (************************************************
00 0076   *
00 0076   *    PROCEDURE to draw a straight line
00 0076   *
00 0076   ************************************************)
00 0076
00 0076   PROCEDURE DrawLine (X1,Y1, X2,Y2 : Integer);
10 0076
10 0076   BEGIN
11 007A     IF X1 > X2 THEN BEGIN  (* Make X1,Y1 to the *)
12 0087       DeltaX := X1;        (* left of X2,Y2     *)
12 008D       X1 := X2;
12 0091       X2 := DeltaX;
12 0097       DeltaY := Y1;
12 009D       Y1 := Y2;
12 00A1       Y2 := DeltaY;
12 00A7       END;
11 00A7
11 00A7     DeltaX := X2 - X1;
11 00B9     DeltaY := Y2 - Y1;
11 00CB     BitMask := $80 LSR (X1 AND 7);
11 00EC     Address := PTR ((((Y1 LSL 8) + X1) LSR 3) + ScreenAddr);
11 0123     RowOffset := 32;
11 012A
11 012A     IF DeltaY < 0 THEN BEGIN
12 0139       DeltaY := -DeltaY;
12 0146       RowOffset := -32;
12 0152       END;
11 0152
11 0152     IF DeltaX > DeltaY THEN Horizontal ELSE Vertical;
11 0178   END;
00 017C   (************************************************
00 017C   *  Program Main Entry
00 017C   ************************************************)
00 017C
00 017C   VAR X, Y, I : Integer;
00 017C
00 017C   BEGIN
01 0182     SetBits (ScreenPage, 7, PageRegister);
01 0198     SetBits (VDGValue, 3, VDGRegister);
01 01AE     BYTE[VCRegister] := (BYTE[VCRegister] AND 7) OR VCRValue;
01 01CF
01 01CF     FOR I := ScreenAddr TO ScreenAddr+$17FF DO
01 01E9       BYTE[I] := 0;
01 01FC
01 01FC     FOR Y := 0 TO 95 DO BEGIN
02 020E       X := Y + Y;
02 0218       DrawLine (X, 96-Y, 255-X, 96+Y);
02 0250       END;
01 025B
01 025B     Address := PTR (ScreenAddr);
01 0262     I := 0;
01 0266     FOR X := 0 TO 255 DO
01 0278       FOR Y := 0 TO 191 DO
01 028A         IF PixelOn (X,Y) THEN I := SUCC (I);
01 02BF
01 02BF     WRITELN (I, ' PIXELS SET');
01 02E8   END.
```

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See Page 114

line from X1,Y1 to X2,Y2 by setting up the public variables and calling either Horizontal or Vertical. DeltaX is the horizontal distance of the line and DeltaY is the vertical distance. BitMask contains an eight-bit mask with a one in the correct position for the beginning of the line. Address is the address of the byte that begins the line. RowOffset is the amount to increment the address in order to move vertically (-32 to go up, 32 to go down). DrawLine then calls either Horizontal or Vertical to actually draw the line depending on whether the line is predominately horizontal or vertical.

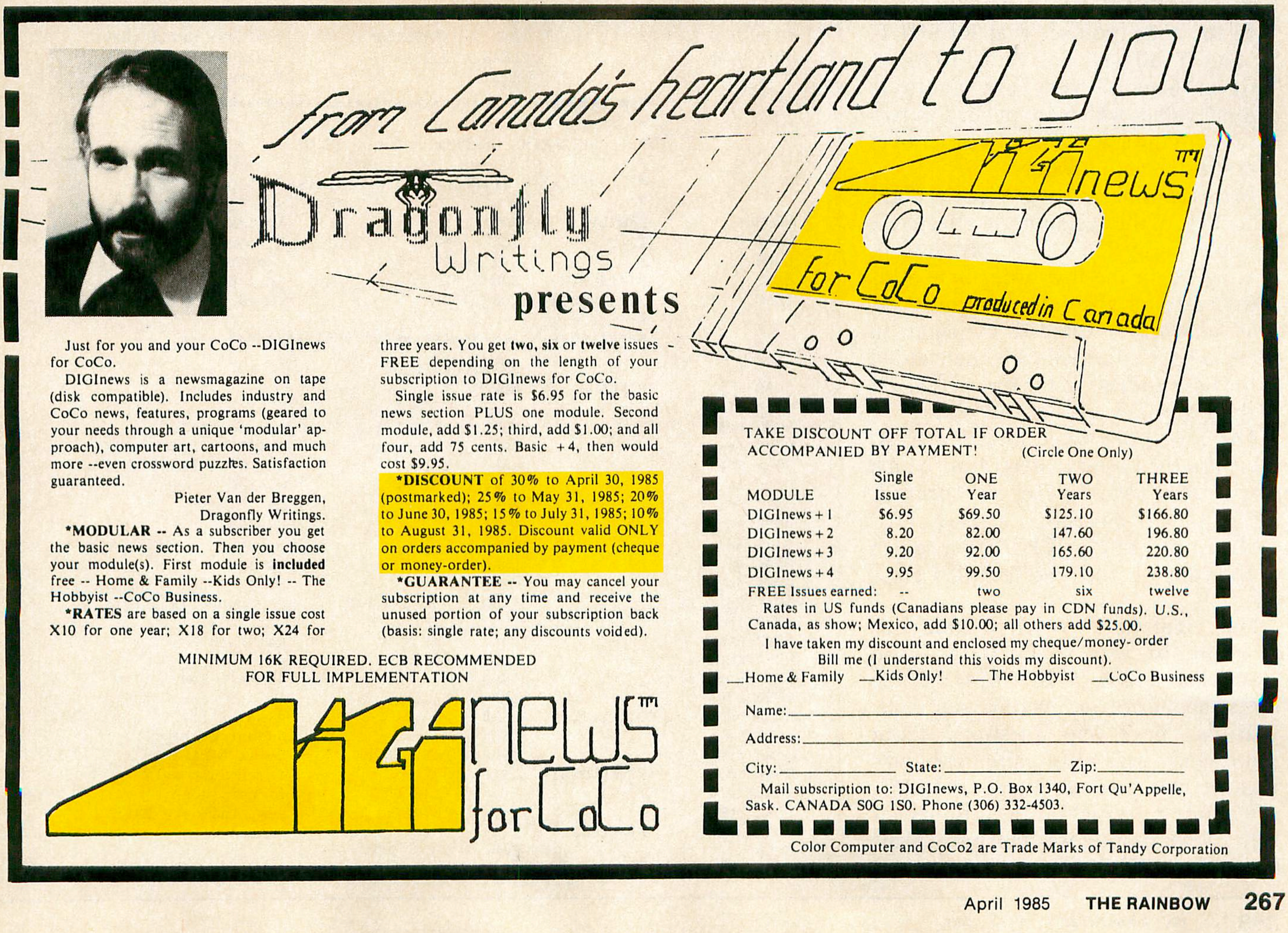
The main program sets up the graphics registers, clears the screen area and then calls DrawLine to draw some lines in a pattern. It then invokes PixelOn to check all 49,152 pixels on the screen. When you run the program you will see that this nested FOR loop requires about 12 seconds to execute.

The Assembly Language Routines

Horizontal and Vertical are very similar routines. The basic idea behind each is to set a bit and then go to the next bit position on the predominate

Listing 2:

```
                    ***********************************************
                    *
                    *     DRAW A PRIMARILY HORIZONTAL LINE
                    *
                    *     PROCEDURE HORIZONTAL;
                    *
                    ***********************************************

                    ADDRESS       EXT                       beginning address
                    BITMASK       EXT                       bit mask
                    DELTAX        EXT                       X delta X value
                    DELTAY        EXT                       Y delta Y value
                    ROWOFFSET     EXT                       row offset

                                  PUBLIC HORIZONTAL
 0000               HORIZONTAL    EQU    *

 0000 6FE2                        CLR    ,-S                initialize
 0002 6FE2                        CLR    ,-S                remainder
R0004 AE8D FFF8                   LDX    ADDRESS,PCR        X->first byte
R0008 10AE 8DFF                   LDY    DELTAX,PCR         Y=loop counter
      F3
 000D 3121                        LEAY   1,Y                allow for zero

 000F A684          HORZLOOP      LDA    0,X                get a byte
R0011 AA8D FFEB                   ORA    BITMASK,PCR        set bit
 0015 A784                        STA    0,X                update byte
R0017 648D FFE5                   LSR    BITMASK,PCR        shift bit
 001B 2406                        BCC    NOTSHIFTOUT        shifted out?
R001D 668D FFDF                   ROR    BITMASK,PCR        yes, put back in
 0021 3001                        LEAX   1,X                go to next byte

 0023 ECE4          NOTSHIFTOUT   LDD    0,S                get remainder
R0025 E38D FFD7                   ADDD   DELTAY,PCR         add Y delta
 0029 EDE4                        STD    0,S                update remainder
R002B A38D FFD1                   SUBD   DELTAX,PCR         greater than X delta?
 002F 2D08                        BLT    ENDHORZLOOP        if not, next bit
 0031 EDE4                        STD    0,S                YES, update remainder
```



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axis. For Horizontal that is the next bit in the byte; for Vertical that is the same bit 32 bytes away. These routines then determine whether an adjustment is also required on the opposite axis.

In Horizontal, the BitMask is rotated every time a pixel is set. The RowOffset is added only when the sum of the DeltaYs exceeds a DeltaX. A running total of DeltaYs module DeltaX is kept at the top of the stack. In Vertical, the RowOffset is added on every pixel and the BitMask is rotated only when the sum of the DeltaXs exceeds a DeltaY.

You notice that all parameters to these routines are declared as EXT and are accessed using PC-relative addressing. The variables ADDRESS, DELTAX and DELTAY are all accessed as 16-bit variables; BITMASK and ROWOFFSET are accessed as eight-bit variables. This corresponds to the way they were declared in the PASCAL program.

The routine PixelOn has two parameters passed to it and returns a Boolean result. The EQUs at the beginning of the routine define the stack layout to support these parameters. The returned value of a function (in this case RESULT) is considered to be the zeroth parameter and is passed by value.

In the code, you see that RESULT, 'X' and 'Y' all have one added to them. This is because they are one-byte ordinal values which are pushed as two bytes onto the stack. The low order byte contains the actual value.

In this routine, putting 'Y' in the high-order byte of the accumulator effectively multiplies it by 256 (the 'X' resolution). Putting 'X' in the low-order byte adds it to create an absolute pixel number. This number is divided by eight to create a byte offset which is then added to the base address of the screen (passed as the external variable Address).

The low-order three bits of the 'X' value are then used to determine which bit of that byte is to be checked. RESULT+1 contains a zero (for FALSE) or one (for TRUE) on return to indicate whether the specified bit is set.

One final note: When linking this program, be sure to ORIGIN it no lower than 11264 (5120 + 6144) so the screen area does not overlay your code.

If you have any questions about interfacing assembly language with PASCAL, you can call me at (301) 253-1300 during normal business hours for help. Next month we will have some fun with *DEFT Extra.*

```
R0033 A68D FFC9                LDA    ROWOFFSET,PCR     get row offset
 0037 3086                     LEAX   A,X               adjust byte address

 0039 313F       ENDHORZLOOP   LEAY   -1,Y              adjust counter
 003B 26D2                     BNE    HORZLOOP          continue until zero
 003D 3262                     LEAS   2,S               cleanup stack
 003F 39                       RTS                      return

                 *************************************************
                 *
                 *    DRAW A PRIMARILY VERTICAL LINE
                 *
                 *    PROCEDURE VERTICAL;
                 *
                 *************************************************

                               PUBLIC VERTICAL
 0040            VERTICAL      EQU    *

 0040 6FE2                     CLR    ,-S               initialize
 0042 6FE2                     CLR    ,-S               remainder
R0044 AE8D FFB8                LDX    ADDRESS,PCR       X->first byte
R0048 10AE 8DFF                LDY    DELTAY,PCR        Y=loop counter
      B3
 004D 3121                     LEAY   1,Y               allow for zero

 004F A684       VERTLOOP      LDA    0,X               get a byte
R0051 AA8D FFAB                ORA    BITMASK,PCR       set bit
 0055 A784                     STA    0,X               update byte

R0057 A68D FFA5                LDA    ROWOFFSET,PCR     get row offset
 005B 3086                     LEAX   A,X               adjust byte address

 005D ECE4                     LDD    0,S               get remainder
R005F E38D FF9D                ADDD   DELTAX,PCR        add X delta
 0063 EDE4                     STD    0,S               update remainder
R0065 A38D FF97                SUBD   DELTAY,PCR        greater than Y delta?
 0069 2D0E                     BLT    ENDVERTLOOP       if not, next bit
 006B EDE4                     STD    0,S               YES, yes, update remainder
R006D 648D FF8F                LSR    BITMASK,PCR       shift bit
 0071 2406                     BCC    ENDVERTLOOP       shifted out?
R0073 668D FF89                ROR    BITMASK,PCR       yes, put back in
 0077 3001                     LEAX   1,X               go to next byte

 0079 313F       ENDVERTLOOP   LEAY   -1,Y              adjust counter
 007B 26D2                     BNE    VERTLOOP          continue until zero
 007D 3262                     LEAS   2,S               cleanup stack
 007F 39                       RTS                      return
                 *************************************************
                 *
                 *    DETERMINE WHETHER A PIXEL IS ON
                 *
                 *    FUNCTION PIXELON (X,Y : INTEGER) : BOOLEAN;
                 *
 0008            RESULT        EQU    8                 boolean result
 0006            X             EQU    6                 X coordinate
 0004            Y             EQU    4                 Y coordinate
 0002            STATICPTR     EQU    2                 (not used)
 0000            RETURNADDR    EQU    0                 (used via RTS)
                 *
                 *************************************************

                               PUBLIC PIXELON
 0080            PIXELON       EQU    *

 0080 6F69                     CLR    RESULT+1,S        assume FALSE
 0082 A665                     LDA    Y+1,S             get Y in upper half
 0084 E667                     LDB    X+1,S             get X in lower half
 0086 44                       LSRA                     divide
 0087 56                       RORB                     by 2
 0088 44                       LSRA                     divide
 0089 56                       RORB                     by 4
 008A 44                       LSRA                     divide
 008B 56                       RORB                     by 8
R008C E38D FF70                ADDD   ADDRESS,PCR       D->appropriate byte
 0090 1F01                     TFR    D,X               put in X
 0092 A667                     LDA    X+1,S             get back X
 0094 C680                     LDB    #$80              get mask in B
 0096 8407                     ANDA   #7                isolate low 3 bits
 0098 2704                     BEQ    PIXELNOSHIFT      if zero, not shift
 009A 54         PIXELLOOP     LSRB                     else, shift B
 009B 4A                       DECA                     adjust count
 009C 26FC                     BNE    PIXELLOOP         do it A times
 009E E584       PIXELNOSHIFT  BITB   0,X               is the bit set?
 00A0 2702                     BEQ    PIXELOUT          if not, done
 00A2 6C69                     INC    RESULT+1,S        yes, indicate TRUE
 00A4 39         PIXELOUT      RTS                      return
 00A5                          END
```

OS-9 SOFTWARE WITH X-TRA POWER

XTERM

XTERM is a full featured OS-9 communications program that takes full advantage of the power of OS-9. It works with the normal text screen, XSCREEN, or the Wordpak 80 column board.

XTERM is menu oriented for ease of use, it is simple to use even for the novice OS-9 user. And yet, XTERM is powerful enough for the expert OS-9 user.

Some of the features of XTERM include: full upload and download support with remote buffer operation; supports XON/XOFF protocol; 110/300/600/1200 baud, 5/6/7/8 bits, even/odd/no parity, full or half duplex; able to execute an OS-9 shell command from within XTERM.

XTERM works with a Color Computer using the standard serial interface, but also will work with a hardware serial port. Also, if you are using a hardware parallel printer port, you can print data to the printer as it is received.

XTERM $59.95

XMENU

XMENU is a system that creates a menu-driven environment for the Color Computer using OS-9. OS-9 now becomes easy-to-use with command selections made from menus. Menus are included to access OS-9 commands. An easy-to-use utility is provided that allows for the creation and maintenance of menus.

XMENU works with XSCREEN, the normal text screen, O-PAK, and the WORDPAK 80-column board.

XMENU $39.95 NEW

XWORD

XWORD is a powerful word processing system for the Color Computer using OS-9. XWORD is feature packed with only a few features mentioned here.

Some of the editing features of XWORD include: true character oriented full screen editor; works with the normal text screen, XSCREEN, O-PAK, or WORDPAK 80 column card; full block commands with blocks displayed in inverse characters (except with normal text screen) for easy block manipulation; file size not limited to a buffer size; full find and replace commands with wildcard character; able to execute an OS-9 shell command in the middle of editing. Many, many more features, too many to mention here.

Some of the formatting features of XWORD include: proportional spacing supported; perfectly aligned hanging indents and columns, even when using proportional characters; full printer control with control of character size, emphasized, italics, overstrike, underlining (with or without spaces), super and sub-scripts; up to 10 header/footers; page numbering in decimal or Roman numerals; margins and headers can be set differently for even and odd pages; automatically reads printer initialization file to define XWORD for your printer (many included, and easy to write or modify your own). Many more features.

XWORD $79.95

XSCREEN

XSCREEN creates a high resolution screen for the Color Computer using OS-9. This high resolution screen gives you 24 lines of text with 51, 64, or 85 characters per line. Characters can be either white on a black background or vice versa. Easy menu operation.

XSCREEN $19.95

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Color Connection 108
Color Software Services 199
Colorware 48, 49, 50, 51
Computer Island 152, 153
Computer Plus 3, 38
Computer Systems Distributors 31
Computerware 258, 259
Computize, Inc. 273
Cosmos Computer Services Inc. 137
Custom Computer Products 231
Custom Software Engineering 147
Data-Comp 73
Datafact Software LTD 143
Dataman International 138, 139
Dayton Associates of W. R. Hall, Inc. 184
Deft Systems 17
Delker Electronics 79
Derby City Software 64
Derringer Software 22, 23, 198, 219
Dorsett Educational Systems 113
Double Density Software 232, 233
Dragon User 223
Dragonfly Writing 267
DSL Computer Products 204
Duggers Growing Systems 80
DYNACALC 135
E.D.C. Industries 101
EAP Co. 216
Elite Software 65, 66, 67
Endicott Software 239
Federal Hill Software 14, 243
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GIMIX 274
GRAFX 68
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Green Mountain Micro 241
Hard Drive Specialists 81
Hawkes Research Services 24
HJL div. of Touchstone
Technology, Inc. 28
Frank Hogg Laboratory IBC
Howard Medical 33, 34
Incentive Software 209
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D.P. Johnson, 262
Kelly Software Distributors 218
Key Color Software 213
KRT Software 112
Leffler, D.J. 56
Mark Data Products 156, 157, 191
Maxsys Electronics & Software 52
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MichTron 35, 168
Micro Accessories 211
Micro Data Systems 95
Micro Works, The 91
Microcom Software 39
Microtech Consultants Inc. 269
Microware Systems Corporation 249
Microworld II 220
Mix, Tom Software IFC, 102, 103,
Moreton Bay 202, 203
Nexus 94
Northglenn Software Co. 224
NOVASOFT 244
Oelrich Publications 222
Other Guys Software, The 174
Owls Nest Software 227
Owl-Ware 63
Parsons Software 220
PBJ, Inc. 55
PCM 169
PD Software 224
Perry Computers 175
Polygon Co. 144
Dr. Preble's Programs 193
Prickly-Pear Software 37
PXE Computing 15
R.G.S Micro Inc. 106, 107, 250, 251
Radio Shack 186, 187
Rainbow Adventure Contest 41
Rainbow Bookshelf 225
Rainbow On Tape 217
RAINBOWfest 114, 115
REM Industries 93
Robotics 205
Saguaro Software 129
Softmart 96
Software Connection 215
Software House, The 90
Software Plus 25
Software Support, Inc. 10, 11
South East Media 145
Spectral Associates 246
Spectro Systems 212
Spectrum Projects Inc.
121, 122, 123, 125, 126, 127, 255
Speech Systems 177, 178, 179, 180, 181
STYLO Software, Inc. 263
Sugar Software 104, 228, 229
T & D Software 64
TCE Programs, Inc. 118, 148
Tepco 149
Thinc 198
Tri-Tech Electronics 133
Triad Pictures 62
True Data Products 84, 85
Undercolor 149
Valley Micro 40
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VIP Technologies (Softlaw Corp.)
26, 27
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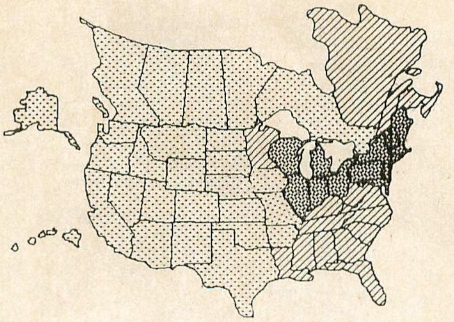

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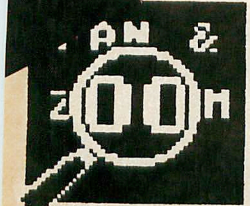

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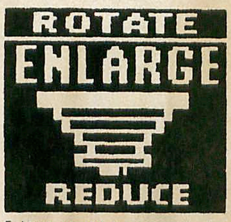
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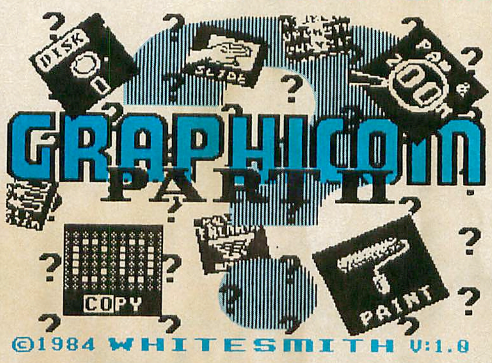
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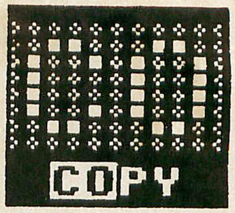
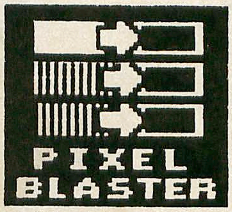
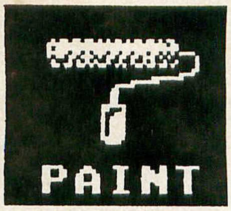
GRAPHICOM PART][is a menu-driven graphics utility that does not require the original GRAPHICOM to run. It includes many of the functions that are missing in GRAPHICOM and will load and save both STANDARD (binary) and GRAPHICOM format screens. GRAPHICOM PART][requires a 64K Color Computer or Color Computer II, and at least one disk drive. It supports 1 to 4 disk drives, keyboard or joystick input, COLOR or B/W (hi-res) operation, and 4 screen display modes. "OOPS" command provides recovery after mistakes, and allows experimenting. Supplied on disk with a 34 page manual.



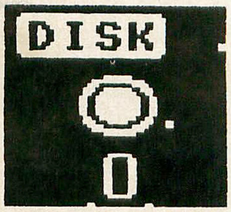
Reproduce and enlarge small areas of the screen with icons or patterns for backgrounds, logos, etc. Over 80 icons supplied on disk (also user-defineable).


PIXEL
BLASTER

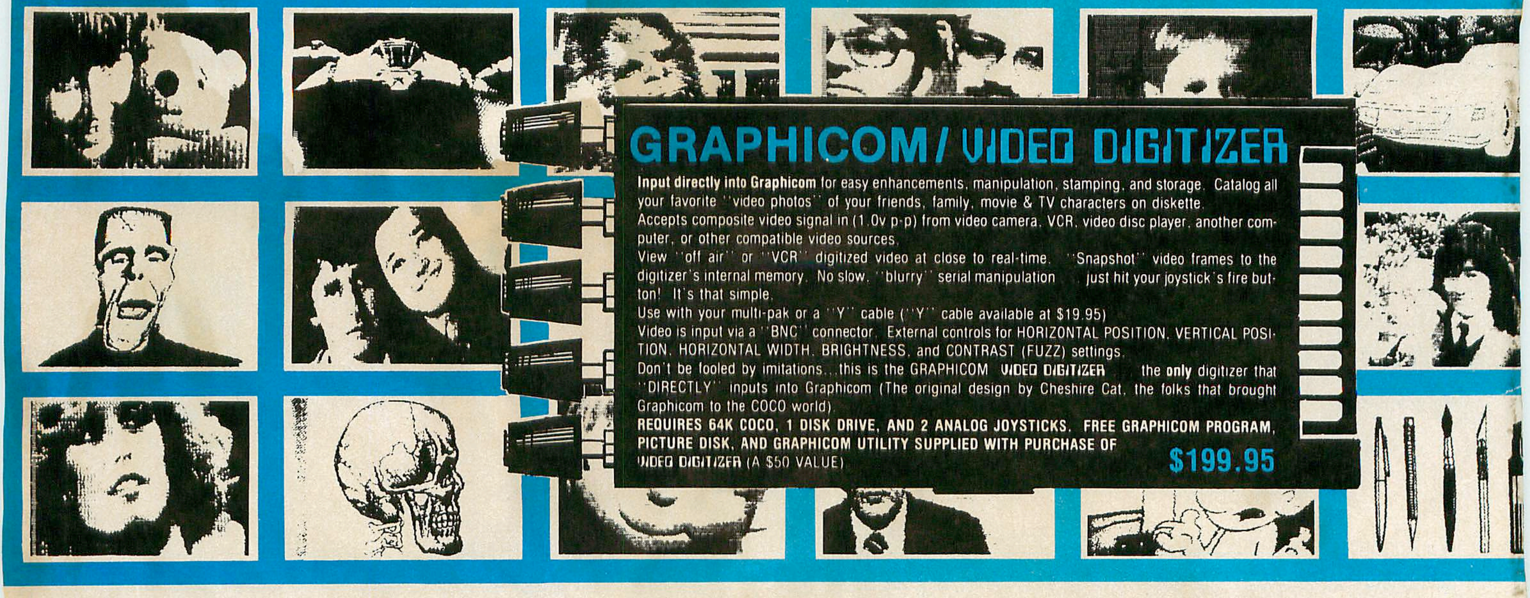
Substitute colors, swap BLUE and RED, remove WHITE (removing all color widens lines for painting!), create color separations.



More than 50 different colored shades and patterns available (over 200 if you count the 4 display modes...) Additional patterns may be user defined!



Load & save screens in either GRAPHICOM or STANDARD format, copy screens from one format to another. Supports single or multiple (up to 4) disk drive system.



GRAPHICOM/ VIDEO DIGITIZER

Input directly into Graphicom for easy enhancements, manipulation, stamping, and storage. Catalog all your favorite "video photos" of your friends, family, movie & TV characters on diskette.

Accepts composite video signal in (1.0v p-p) from video camera, VCR, video disc player, another computer, or other compatible video sources.

View "off air" or "VCR" digitized video at close to real-time. "Snapshot" video frames to the digitizer's internal memory. No slow, "blurry" serial manipulation ... just hit your joystick's fire button! It's that simple.

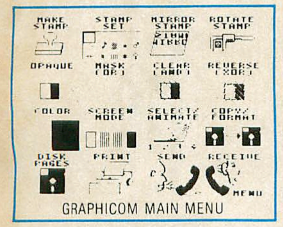
Use with your multi-pak or a "Y" cable ("Y" cable available at $19.95)

Video is input via a "BNC" connector. External controls for HORIZONTAL POSITION, VERTICAL POSITION, HORIZONTAL WIDTH, BRIGHTNESS, and CONTRAST (FUZZ) settings.

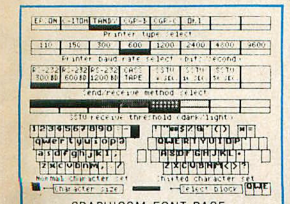
Don't be fooled by imitations...this is the GRAPHICOM **VIDEO DIGITIZER** ... the **only** digitizer that "DIRECTLY" inputs into Graphicom (The original design by Cheshire Cat, the folks that brought Graphicom to the COCO world).

REQUIRES 64K COCO, 1 DISK DRIVE, AND 2 ANALOG JOYSTICKS. FREE GRAPHICOM PROGRAM, PICTURE DISK, AND GRAPHICOM UTILITY SUPPLIED WITH PURCHASE OF VIDEO DIGITIZER (A $50 VALUE)

$199.95


MAKE STAMP
STAMP SET
MIRROR STAMP
ROTATE STAMP
OPAQUE
MASK (OR)
CLEAR (AND)
REVERSE (XOR)
COLOR
SCREEN MODE
SELECT/ ANIMATE
COPY/ FORMAT
DISK PAGES
PRINT
SEND
RECEIVE
MENU

GRAPHICOM MAIN MENU


EPSON
C-ITOH
TANDY
CGP-1
CGP-C
OKI
Printer type select
110
150
300
600
1200
2400
4800
9600
Printer baud rate select (bits/second)
RS-232 300 BD
RS-232 600 BD
RS-232 1200 BD
CASS TAPE
Send/receive method select
SSTV receive threshold (dark/light)
Normal character set
Shifted character set
Character size
Select block

GRAPHICOM FONT PAGE

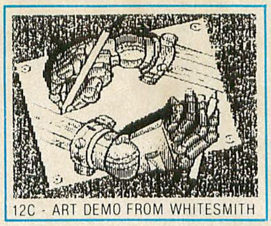
GRAPHICOM $24.95

Simply stated - One of the finest graphic programs written for the Color Computer!

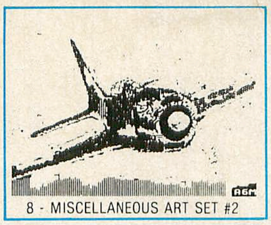
FEATURES

- U-S-E-R F-R-I-E-N-D-L-Y!
- 4 Display modes (including Hi-Res red/blue artifact)
- Animate mode
- Color Palette with over 15 color patterns for use with Hi-Res artifact
- Send/Receive pictures over standard modem at 300, 600, or 1200 baud
- Supplied utility allows capturing Hi-Res screens from most COCO arcade games (even protected ones)
- Multiple Hi-Res character fonts (user redefinable)
- Supplied utility for transferring Graphicom screens to Basic or other M/L programs
- Supplied utility for loading screens from Basic or other sources
- Built in Hi-Res SCREEN PRINT (compatible with EPSON, C-ITOH, GEMINI-10, OKI, plus Radio Shack's LP-VII, LP-VIII, DMP-100, DMP-200, and GCP-115 printers) from 110 to 9600 baud
- Slow-scan television SEND/RECEIVE options
- Many additional features, operating hints, hardware mod's and suggestions, etc

★ EASY TO LEARN GRAPHIC MENU ★
REQUIRES 64K COCO, 1 DRIVE SYSTEM, AND
2 ANALOG JOYSTICKS



12C - ART DEMO FROM WHITESMITH



8 - MISCELLANEOUS ART SET #2

PICTURE DISKS $9.95

Available from COMPUTIZE

4C - Artifact color palette
5C - Large character sets drawn with master design (from Derringer Software)
6C - Same as 5C but set up as stamp set
7 - Miscellaneous Art Set #1
8 - Miscellaneous Art Set #2
9 - Miscellaneous Ads and Examples
10 - Miscellaneous Fonts
11C - Artifact color palette type fonts

12C - Art demo from WHITESMITH

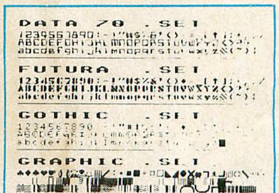
Color Hi-res artworks from Whitesmith, the people that brought you Graphicom Part][, introduced by an animated marching band performing a Sousa march in 4-part harmony!

13C - GRAPHICOM PART II function demo

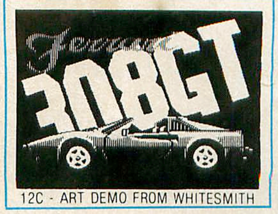
☞ GCII FONT DISKS

Each disk contains 40 or more font files (10 or more GRAPHICOM PART][fonts, 4 versions of each, one for each display mode), and three "FONT INDEX" screens to make identification and selection easy.

14C - GCII Fonts Disk #1
15C - GCII Fonts Disk #2
16C - GCII Fonts Disk #3


DATA 70 .SET
FUTURA .SET
GOTHIC .SET
GRAPHIC .SET

☞ 15C - G-C II FONT DISK



12C - ART DEMO FROM WHITESMITH

CALL OR WRITE
FOR YOUR SAMPLE
DIGITIZED PICTURE
CATALOG TODAY!

computize

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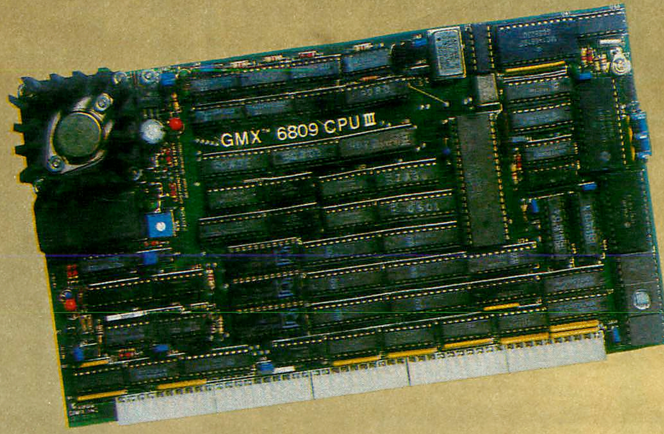
VISA MasterCard

Check or M.O. • Add $3.00 shipping • PA residents add 6% sales tax

ATTENTION COCO CLUBS
CALL OR WRITE FOR
INFORMATION ABOUT
SOFTWARE DEMOS
FOR CLUBS.

GIMIX STATE OF THE ART 6809 SYSTEMS FOR THE SERIOUS USER.



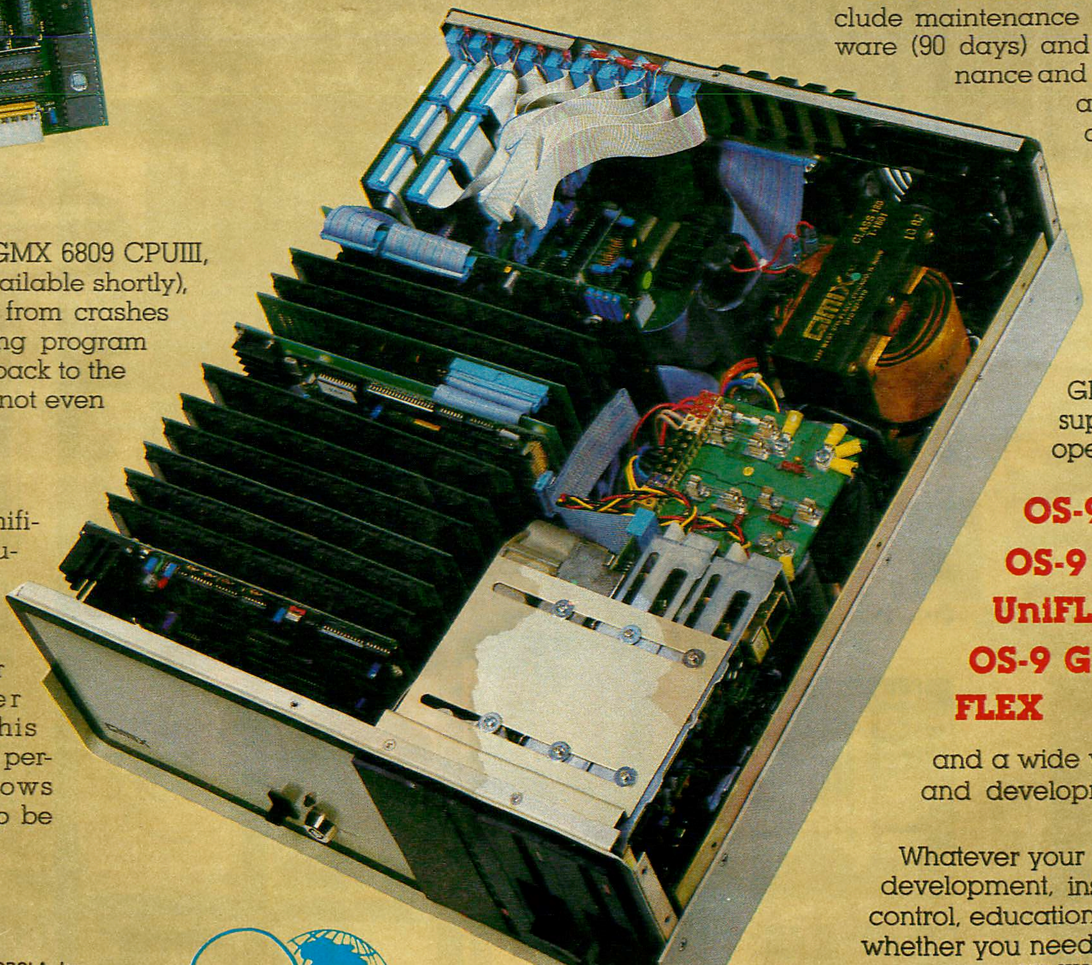
GIMIX has 19MB or high performance 47MB Winchester Drive Systems and/or Floppy Disk Drive Systems.

For the user who appreciates the need for a bus structured system using STATIC RAM and powered by a ferro resonant constant voltage transformer.

GIMIX has single user systems that can run both FLEX and OS-9 or Multi user systems for use with UniFLEX or OS-9.

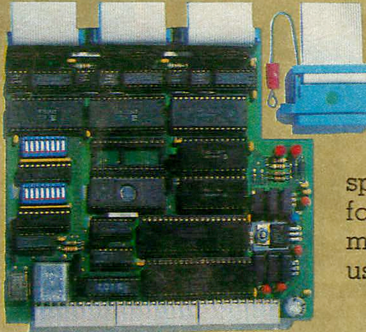
GIMIX versions of OS9 and UniFLEX include maintenance and support by Microware (90 days) and TSC (1 year). Maintenance and support after this period are available at extra cost.

(NOTE: this support and maintenance is only for use with approved GIMIX hardware)



For the ultimate in performance, the Unique GMX 6809 CPUIII, using either OS-9-GMXIII or UniFLEX GMXIII (available shortly), gives protection to the system and other users from crashes caused by defective user programs. e.g. During program development, a programmer who crashes goes back to the shell or the debugger, while the other users are not even aware anything occurred.

The intelligent serial I/O processor boards significantly reduce system overhead by handling routine I/O functions, thereby freeing up the host CPU for running user programs. This speeds up system performance and allows multiple terminals to be used at 19.2K baud.



GIMIX 6809 systems support five predominant operating systems:

OS-9 GMX III,
OS-9 GMX II,
UniFLEX,
OS-9 GMX I,
FLEX

and a wide variety of languages and development software.

Whatever your application: software development, instrumentation, process control, educational, scientific or business; whether you need single or multi-user capabilities, GIMIX has hardware and the operating systems to get the job done reliably.

Please phone or write if you need further information.

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All for only **$99.95.** Rush your order in today.

SPECIFICATIONS: XEX's SCREEN has user definable fonts, many of which are supplied. 24 X 51 is the default screen size, but this can be changed to suit the user. Smooth scroll, sideways scroll, invert display, and 4 cursor types are just some of the features. XEX's KEYBOARD has user definable keys, supports extra key keyboards, auto key repeat, line editing and command repeat. XEX DISK DRIVERS supports all sizes, 35, 40 or 80 track, single and double sided and density. Also supports double stepping so that 40 track disks can be used with 80 track drives. Individual stepping rates for drives are definable. MODULAR CONSTRUCTION allows easy modification and changes to XEX. It is easy to add or modify the drivers for things like Word-Pak and other hardware, because most of the source is included. SOURCE IS INCLUDED for the screen drivers, keyboard drivers, disk drivers, printer drivers, initialization code, other system code, external terminal, and many of the utilities, making modifications simple. It is easy to create your own custom version of XEX. Other major packages include ED, a powerful screen-oriented line editor. ASM is a conditional MACRO assembler. DBASIC is Radio Shack Disk BASIC modified to work with XEX. RTF allows copying text files from RS BASIC to XEX. 128K support is built into XEX. XEX stands for eXtended FLEX and is compatible with FLEX, runs all FLEX software and supports all the functions that CC FLEX does, plus the above added features. XEX is supplied on three 5-inch disks and has a 3-ring bound manual. The tutorial section gets you up and running with a minimum of hassle or confusion. XEX proves that an operating system doesn't have to be complicated to be powerful.

COMPARISION CHART BETWEEN XEX AND OS-9

FUNCTION	XEX	OS9
Hi-Res screen (24X51 default)	YES	NO (O-Pak $34.95)
Supports all disk drives	YES	NO (SDisk w/bootfix $35.95)
User definable keyboard	YES	NO
User friendly, easy to use	YES	NO
Some system source included	YES	NO
Powerful screen like editor	YES	NO (Simple line editor)
Conditional Macro Assembler	YES	NO (No Macro capability)
RS BASIC compatible with DBASIC	YES	NO
Supports 128K upgrades	YES	NO
One disk boot	YES	NO (Yes if you have DOS)
Telephone support	YES	NO
Supports 3rd party hardware	YES	NO

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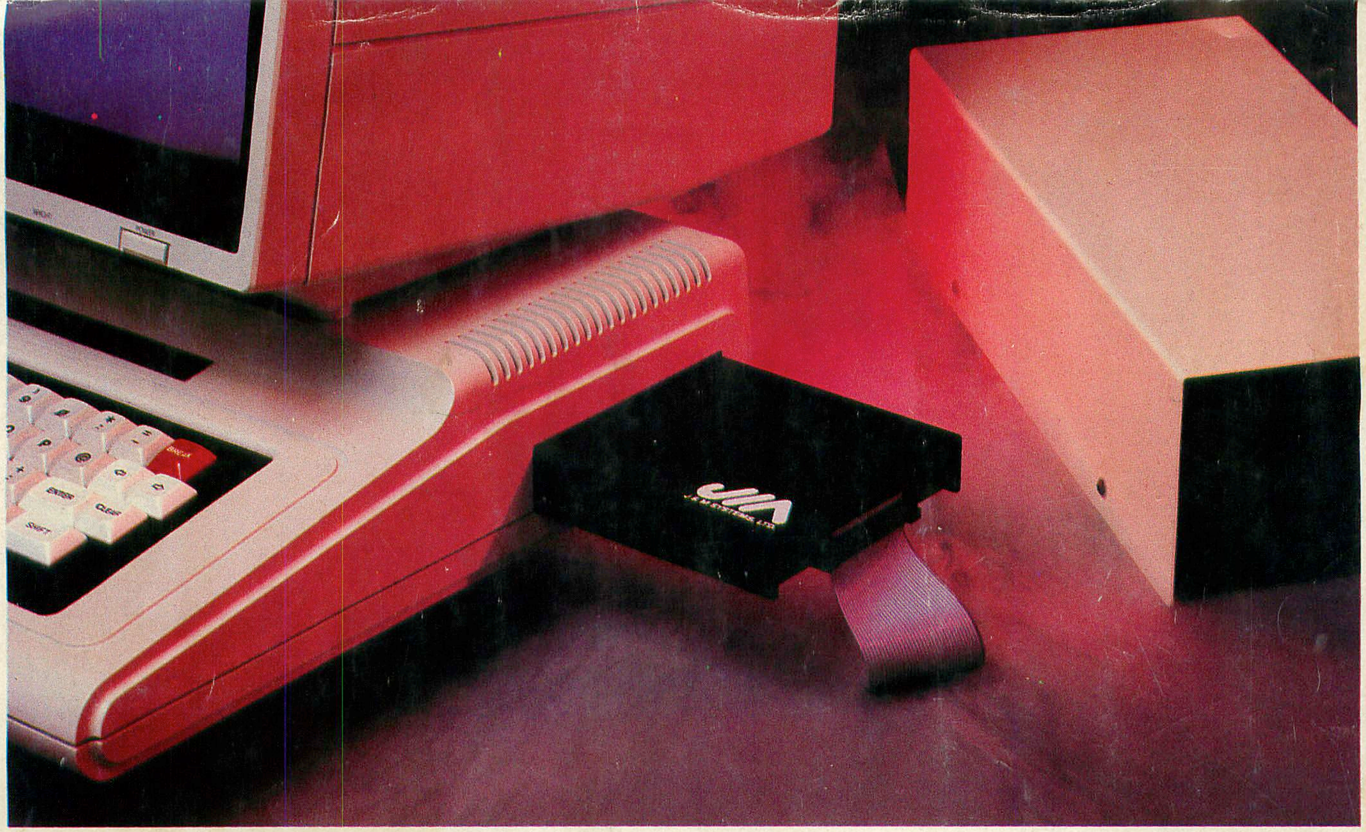
PHONE (315) 474-7856 • TELEX 646740



Heat Up Your COCO With J&M'S *Hot* Disk Controller

DRIVE 0 SYSTEM $289

Upgrade your COCO by adding J&M's famous disk controller, our advanced JDOS operating system, and a top quality drive all for only $289.

Drive 0 System with one single side drive	$289
Drive 0,1 System with two single side drives ...	$429
Drive 0,1 System with two double side drives ...	$499

JFD-COCO DISK CONTROLLER $139

The J&M Systems' JFD-COCO Disk Controller has set new standards in performance and quality. Gold contacts assure reliability, built-in digital phase lock loop data separator means NO adjustments, and the JFD-COCO is plug compatible with both the original COCO and the new COCO-2.

JDOS

JDOS implements all RS DOS basic commands, plus many more, including auto line numbering, up and down arrow keys for scrolling, DOS to boot OS/9*, FLEX*, and error trapping. JDOS supports RS compatible disk formats, plus handles 40 track single side and double side drives.

DISK DRIVES

A drive is just a drive without a case. We manufacture our own high quality cases and TransPower power supplies. Gold contacts are brought out at the back for easy connection.

*MEMORY MINDER**

Memory Minder is a disk drive test program that makes the following major checks of your drives without disassembly or special test equipment: head alignment, disk speed, index hole timing, azimuth, hysteresis, read sensitivity, and clamping. Memory Minder can be used to actually align the drives while viewing the graphics on the screen. This program is a must for anyone who values the data that is saved on diskettes.

MM-COCO-1 Memory Minder for single side drives................................	$79
MM-COCO-2 Memory Minder for double side drives................................	$99

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*OS/9 is a registered trademark of Microware, Inc.
*Memory Minder is a registered trademark of J&M Systems, Inc.

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